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Research Article
Artigo de Pesquisa
Artículo de Investigación

Standardization of eHealth Literacy Scale scores for assessing digital health literacy

Normatização dos escores da escala eHealth Literacy Scale para avaliação do letramento digital em saúde

Estandarización de las puntuaciones de la escala eHealth Literacy Scale para evaluar la alfabetización digital en salud

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ABSTRACT

Objective: to analyze the normative data of the scores of the Brazilian version of the eHealth Literacy Scale (eHeals) instrument for assessing digital health literacy. **Method:** cross-sectional study with 502 Brazilian adults in 2019. Data collected using the eHeals instrument and sociodemographic questionnaire. Decision trees and discriminant analysis were applied. Study approved by the Research Ethics Committee. **Results:** Discriminant analysis determined the eHeals classification ranges based on the distribution of scores. The decision tree indicated that education significantly affected the scale results. Thus, individuals with incomplete elementary school education up to II: low (up to 10), medium (11 to 25), high (27 to 40), and higher education: low (up to 25), medium (25 to 32) and high LDS (33 to 40). **Conclusion:** the classification of digital health literacy levels using eHeals in adults should be controlled by the participants' education levels.

Descriptors: Psychometrics; Validation Studies; Health Literacy; Computer Literacy.

RESUMO

Objetivo: analisar os dados de normatização dos escores da versão brasileira do instrumento *eHealth Literacy Scale* (*eHeals*) para avaliação do letramento digital em saúde. **Método:** estudo transversal com 502 adultos brasileiros, realizado em 2019. Dados coletados pelo instrumento *eHeals* e questionário sociodemográfico. Foram aplicadas árvores de decisão e análise discriminante. Estudo aprovado pelo Comite de Ética em Pesquisa. **Resultados:** a análise discriminante determinou as faixas de classificação do eHeals a partir da distribuição dos escores. A árvore de decisão indicou que a escolaridade afetou de forma relevante os resultados da escala. Os indivíduos com escolaridade até o ensino fundamental II incompleto: baixo (até 10), médio (11 a 25), alto (27 a 40), e escolaridade acima: baixo (até 25), médio (25 a 32) e alto LDS (33 a 40). **Conclusão:** a classificação dos níveis de letramento digital em saúde de adultos pelo eHeals deve ser controlada pelos níveis de escolaridade dos participantes.

Descritores: Psicometria; Estudos de Validação; Letramento em Saúde; Alfabetização Digital.

RESUMEN

Objetivo: analizar los datos de estandarización de las puntuaciones de la versión brasileña del instrumento eHealth Literacy Scale (eHeals) para evaluar la alfabetización digital en salud. **Método:** estudio transversal con 502 adultos brasileños que tuvo lugar en 2019. La recolección de datos se hizo mediante el instrumento eHeals y un cuestionario sociodemográfico. Se aplicaron árboles de decisión y análisis discriminante. El Comité de Ética en Investigación aprobó el estudio. **Resultados:** El análisis discriminante determinó los rangos de clasificación de eHeals con base en la distribución de puntuaciones. El árbol de decisión indicó que la educación afectó significativamente los resultados de la escala. Individuos con educación primaria incompleta: baja (hasta 10), media (11 a 25), alta (27 a 40), y educación superior a esa mencionada: baja (hasta 25), media (25 a 32) y alto LDS (33 a 40). **Conclusión:** la clasificación de los niveles de alfabetización en salud digital en adultos con eHeals debe ser controlada por los niveles de educación de los participantes.

Descriptores: Psicometría; Estudio de Validación; Alfabetización en Salud; Alfabetización Digital.

INTRODUCTION

The Health Literacy (HL) field has been studied in recent decades as an important population health determinant and its aspects highlighted in recent Global Health Promotion conferences[1].

According to the Health Promotion Glossary, HL "represents the personal knowledge and competencies that accumulate through daily activities, social interactions and across generations. Personal knowledge and competencies are mediated by the organizational structures and availability of resources that enable people to access, understand, appraise and use information and services in ways that promote and maintain good health and well-being for themselves and those around them[2]." Therefore, it is an important resource for the health and quality of life of individuals and populations and should be health professionals' attention focus to provide the best care possible[3].

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In recent decades, an increasing number of health information and services has been made available via the Internet. This trend has been heightened by the advent of the Coronavirus Disease 2019 (COVID-19) pandemic, currently turning the virtual universe into one of the main communication means in terms of health[4,5].

In Brazil, estimates show that approximately 81% of the population used the Internet in 2021, most significantly social classes A and B, with cell phones as the most used devices for access. Moreover, it was observed that a significant number of users used the Internet to seek information or services during the same year, with the most frequently sought-after services being related to public health6.

Digital transformation has brought several challenges with it; among them, maximizing digital health benefits for the population. One of the ways to achieve this is to improve health literacy levels in the digital health context.

The Digital Health Literacy field is an evolution of electronic Health Literacy (eHealth Literacy) and comprises a range of skills and knowledge that individuals and populations must possess, which are essential for the production of technology-based digital health interactions and that enable individuals to face or solve health problems[7].

Several instruments have been developed to measure Digital Health Literacy (DHL). However, the electronic Health Literacy Scale - eHEALS (eHealth Literacy Scale)[8,9] remains the most widely used. It has eight items aimed at assessing a person's knowledge, perceived comfort and proficiency in locating, evaluating and applying electronic health information related to health problems[9].

eHEALS was originally developed in English[9] and later translated into other languages, including Brazilian Portuguese, and its psychometric properties were tested in different populations[9-11]. Although studies that evaluated the psychometric properties of the scale indicate that it is valid for measuring the eHealth Literacy construct[10-13], the unprocessed results of its scores alone do not provide much information about the meaning of the information, that is, low, moderate or high Electronic Health Literacy (EHL) levels. To do this, it is necessary to carry out tests to standardize the scores.

Normalization produces interpretation standards in relation to the score that the individual obtained when completing, for example, a research instrument indicating the participant's relative position in the normative sample and their performance when compared to other people in the sample[14]. Despite its importance for categorization of subjects, based on a critical review of the scientific literature carried out until February 2023, the authors of the current study did not find any research with eHEALS that consistently investigated the standardization data of its scores in the populations to which it was applied.

Therefore, there is a need for studies that use robust analyses to establish valid and reliable cutoff point criteria for classifying EHL levels based on eHEALS. This will provide support for better understanding the concept of EHL in the country and, consequently, support the planning of health interventions.

Thus, the objective of this study was to analyze the scoring standardization data corresponding to the Brazilian version of the eHealth Literacy Scale (eHEALS), for the EHL assessment.

METHODS

This is a cross-sectional study that included the standardization process for the Brazilian Portuguese version[11] of the eHealth Literacy Scale (eHEALS)[9]. Secondary data were obtained from a previous study that evaluated the eHEALS psychometric properties in a sample of Brazilian adults[11]. This article was prepared in accordance with the Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) guidelines.

The primary study sample consisted of 502 individuals aged at 18 years old, living in areas close to six Family Health Units (FHUs) located in the urban area of the city of Piracicaba, SP, Brazil, with a mean of 80 to 90 individuals selected per Unit. Both the participants and the FHUs were randomly chosen[11].

The inclusion criteria involved adults who did not have mental health and/or cognitive problems and with medical diagnoses recorded in the FHU medical charts, coming from six FHUs. Data collection was carried out at the individuals' homes, on a day and time previously scheduled with community health agents, by filling out the printed instrument with pen and paper in a self-applied format. There was no sample size calculation, considering that the primary study evaluating the psychometric properties of eHEALS used a sample size larger than the one recommended in the literature[11].

To measure the Digital Health Literacy level, the validated eHEALS Brazilian Portuguese version[11] was applied. The instrument consists of eight items aimed at measuring the skills perceived by the individual to locate, evaluate and apply information technologies to health problems[9]. The answers to each item are presented on a Likert scale with scores varying between 1 and 5 (1. Strongly Disagree; 2. Disagree; 3. Undecided; 4. Agree; and 5. Strongly Agree).

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Therefore, the instrument total score can vary between 8 and 40 points, and a higher score indicates that the individual has a higher EHL level[9].

Sociodemographic information was collected, including age, gender, housing (living alone or with someone), family income in minimum wages, ethnic group (white/Asian, indigenous, brown/black) and schooling level (Complete/Incomplete Elementary School I and II, Incomplete/Complete High School, Higher Education).

Initially, an exploratory descriptive study of the eHEALS total score was carried out. The results of the answers given to the item and the total score are presented by frequency, Median (Md), Interquartile Range (IQR), Amplitude (Amp), Minimum (Min), Maximum (Max), Mean ($\bar{x}$) and Standard Deviation (SD).

The first standardization stage was carried out by identifying score cutoff points based on the participants' distribution. The first design consisted of two cutoff ranges (low and high EHL) and the cutoff point was the median of the overall score. The second design had three cutoff ranges: 1st quartile, interquartile range and 3rd quartile, respectively, to classify into low, moderate and high EHL. Finally, the third design had four bands divided for each quartile, qualitatively designated as low, moderate, high and very high EHL.

The participants' distribution into score cutoff points is recurrent in standardization studies and can result in distortions, as the score is not directly analyzed, but considered as a consequence of the participants' position in relation to the cutoff points. Data distribution in instruments rarely responds to the Gaussian curve, and the distribution seeks exactly to find an equivalent distribution for the bands, in terms of the number of participants and not in terms of the score[15]. For this reason, and aiming at greater precision regarding the cutoff points in the ranges and to verify the predictive capacity of classifying individuals, discriminant analysis was used for each of the ranges and eHEALS scores.

Discriminant analysis aims at understanding group differences and predicting the probability of an entity (individual or object) belonging to a specific class or group based on independent metric variables[15]. It allows determining which of the independent variables are most responsible for the differences in the mean score profiles of two or more groups[15]. Thus, it is possible to confirm whether the cutoff points established by the distribution have the property of correctly classifying individuals into the bands.

To verify whether there was any influence of the participants' characteristics on the primary standardization, the effects of age, gender, housing, ethnic group, family income and schooling level were analyzed. To carry out this stage, decision trees were applied for each independent variable (gender, age, housing, income, ethnic group and schooling level) and the eHEALS score.

Decision trees allow us to identify different sets of predictors and different interactions between these predictors for different subgroups, which differs from regression, which normally has a global approach[16,17]. It is a more flexible technique, such as a non-parametric method, which allows releasing distributional and metric assumptions about the data, and is easier to interpret due to the visual representation[18,19].

Among the remarkable advantages of decision trees is the fact that they can naturally handle combinations of numerical and categorical variables. Furthermore, they work well with large data sets[20] and have the ability to model complex relationships between variables without strong model assumptions[21]. If the analysis points to differences between the scores depending on the characteristics of the participants, specific standardization is carried out.

The unadjusted “p”-values were reported, with the exception of the occurrence of values lower than 0.001, as recommended[22]. This procedure seeks to neutralize the possibility that the p-value can be used to indicate “significance” of the analysis and due to inadequate practices in its interpretation23. In this way, the p-value levels were treated as similarity or not of the variable scores, and as Violation of the Null Hypothesis (VHN) or Non-Violation of the Null Hypothesis (NVHN)24. All analyses were accompanied by their respective effect sizes, as recommended in the scientific literature[24,25].

The study was conducted in accordance with national and international ethical guidelines for research involving human beings and approved by the Research Ethics Committee of the Piracicaba Dentistry School/Campinas State University, under Certificate of Presentation for Ethical Appraisal (Certificado de Apresentação para Apreciação Ética, CAEE) number 61605316.5.0000.5418. Free and Informed Consent was obtained from all individuals involved in the study, in written form.

RESULTS

The sample participants had a mean age of 39.3(+13.3) years old, with only 46 subjects (9.3%) over 60 years of age; 328 were female (65.3%), 281 self-reported white skin color (56%). Approximately half of the participants (50.8%) earned monthly family incomes of up to two minimum wages. In relation to housing, 59 stated living alone (11.7%).

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The participants had the following schooling levels: 43 up to Elementary School I (8.6%); 114 up to Elementary School II (22.7%); 272 up to High School (54.2%); and 73 up to Higher Education (14.5%).

The descriptive statistics of the eHEALS items identified that all items on the scale presented answers. Thus, the minimum and maximum for all items varied between one (1) and five (5) points, taking into account the range of four (4), which indicates sensitivity and adequacy of the relationship between the items and the answer possibilities (Table 1).

The total score had a median of 27.00 (Interquartile Range = 10, Min/Max = 8/40 and Amplitude = 32), and the mean was 25.1 (Standard Deviation = 8.12). Furthermore, it was found that the eHEALS item that presented the lowest mean among the participants was item 8 (I feel confident in using information from the Internet to make health decisions).

Table 1: Descriptive statistics of the answers given by Brazilian adults to the items from the eHEALS Brazilian version* (n†=502). Piracicaba, SP, Brasil, 2019.

	Central Tendency and Dispersion Measures				Item Response Frequency - n† (%‡)				
Items / Score	Md§	IQR||	M¶	SD**	1 - Strongly Disagree	2 - Disagree	3 - Undecided	4 - Agree	5 - Strongly Agree
1. I know what health resources are available on the Internet	3.00	2.00	3.18	1.18	69 (13.70)	62 (12.40)	122 (24.30)	206 (41.00)	43 (8.60)
2. I know where to find helpful health resources on the Internet	4.00	2.00	3.25	1.20	65 (12.90)	62 (12.40)	111 (22.11)	207 (41.20)	57 (11.40)
3. I know how to find helpful health resources on the Internet	4.00	1.00	3.35	1.19	58 (11.60)	53 (10.60)	115 (22.90)	203 (40.40)	73 (14.50)
4. I know how to use the Internet to answer my questions about health	4.00	1.00	3.45	1.19	52 (10.40)	51 (10.20)	104 (20.70)	209 (41.60)	86 (17.10)
5. I know how to use the health information I find on the Internet to help me	4.00	1.00	3.46	1.16	49 (9.80)	55 (11.00)	91 (18.10)	230 (45.80)	77 (15.30%)
6. I have the skills I need to evaluate the health resources I find on the Internet	3.00	2.00	3.17	1.22	64 (12.70)	78 (15.50)	137 (27.30)	154 (30.70)	69 (13.70)
7. I can tell high quality health resources from low quality health resources on the Internet	3.00	2.00	3.21	1.25	64 (12.70)	75 (14.90)	139 (27.70)	139 (27.70)	85 (16.90)
8. I feel confident in using information from the Internet to make health decisions	3.00	2.00	2.82	1.23	91 (18.10)	116 (23.10)	134 (26.70)	114 (22.70)	47 (9.40)

*eHEALS = *eHealth Literacy Scale*; †n = Sample; ‡% = Percentage; §Md = Median; ||IQR = Interquartile Range; ¶M = Mean; **SD = Standard Deviation

The following was obtained when defining the classifications: 1st quartile = from 8 to 22, 2nd quartile = from 23 to 27, 3rd quartile = from 28 to 32 and 4th quartile = from 33 to 40. From then on, the first design had the following scoring ranges: low EHL (from 8 to 27 points) and high EHL (from 28 to 40 points). The second design had three ranges, namely: low EHL (from 8 to 22 points), moderate EHL (from 23 to 32 points) and high EHL (from 33 to 40 points). The third design included four bands: low EHL (from 8 to 22 points), moderate EHL (from 23 to 27 points), high EHL (from 28 to 32 points) and very high EHL (from 33 to 40 points).

The discriminant analysis results for the two-band design were MBox = 71.25; $p < 0.001$, F (1, 743747.63) = 71.12, $p < 0.001$; canonical correlation = 0.778; $\lambda = 0.39$; $\chi^2 = 465.05$; $p < 0.001$. The low EHL range (n = 265) had a median of 22 (IQR = 8.50) and the high EHL range (n = 237) had a median of 32 (IQR = 5). The two-band design managed to accurately classify 95.6% of the participants (Table 2), making it possible to correctly classify individuals in the low EHL range and with an 8.3% error in the classification of participants in the high EHL range, who were categorized as having low EHL.

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The discriminant analysis results for the three-band design were MBox = 63.49; $p < 0.001$; F (2, 452386.67) = 31.65, $p < 0.001$; canonical correlation = 0.902; $\lambda = 0.18$; $\chi^2(2) = 838.73$; $p < 0.001$. The low EHL range (n = 124) had a median of 16 (IQR = 11), the moderate EHL range (n = 246) had a median of 27 (IQR = 5.3) and the high EHL range (n = 132) presented a median of 34 (IQR = 5). The three-band design was able to accurately classify 93% of the participants (Table 2), making it possible to correctly classify all individuals in the high EHL band. However, it was observed that 9.7% of the participants in the low EHL range were classified as moderate and that 9.3% of the moderate subjects were classified as in the high EHL range (Table 2).

Table 2: Classification of the eHEALS scoring ranges of Brazilian adults in the two-, three- and four-band designs (n† = 509). Piracicaba, SP, Brazil, 2019.

	Two-band design classification			
	Predicted group association			
	Range	Low	High	Total
n†	Low	243	22	265
	High	0	237	237
%‡	Low	91.7	8.3	100.0
	High	0.0	100.0	100.0

	Three-band design classification				
	Predicted group association				
	Range	Low	Moderate	High	Total
n†	Low	112	12	0	124
	Moderate	0	223	23	246
	High	0	0	132	132
%‡	Low	90.3	9,7	0,0	100.0
	Moderate	0.0	90.7	9.3	100.0
	High	0.0	0.0	100	100.0

	Four-band design classification					
	Range	**Low**	**Moderate**	**High**	**Very High**	**Total**
n†	Low	96	28	0	0	124
	Moderate	0	141	0	0	141
	High	0	0	105	0	105
	Very High	0	0	46	86	132
%‡	Low	77.4	22.6	0.0	0,0	100.0
	Moderate	0.0	100.0	0.0	0,0	100.0
	High	0.0	0.0	100.0	0,0	100.0
	very High	0.0	0.0	34.8	65.2	100.0

n† = Sample; %‡ = Percentage

For the four-band design, the discriminant analysis showed MBox = 295.59; $p < 0.001$; F (3, 434970.89) = 98.26; $p < 0.001$; canonical correlation = 0.927; $\lambda = 0.14$; $\chi^2(3) = 975.13$; $p < 0.001$. The low EHL range (n = 124) had a median of 16 (IQR = 11), the moderate EHL range (n = 141) had a median of 24 (IQR = 2), the high EHL range (n = 105) had a median of 30 (IQR = 1) and the very high EHL range (n = 132) had a median of 34 (IQR = 5).

The four-band design was able to accurately classify 85.3% of the participants, making it possible to correctly classify all individuals in the moderate and high EHL ranges. However, it was observed that 22.6% of the participants in the low EHL range were classified as with moderate EHL and that 34.8% of the participants in the very high EHL range were classified as in the high EHL range, indicating that this categorization generates inaccuracy in the classifications in both extreme ranges.

Through the analyses, it was noticed that it was viable to apply both the two- and three-band designs, as the accuracy rates were very similar. From a qualitative point of view, the three-band structure makes the model more feasible, mainly due to the fact that EHL presents graduation.

After completing the first stage, the possibility of any independent variable(s) affecting the eHEALS results and the schooling level was assessed (Figure 1). Schooling overlapped with all other independent variables assessed. The analyses indicated the clear formation of two blocks: the first one (Node 1) comprised of participants who had not completed Elementary School II; and the second (Node 2) with those who had completed Elementary School or higher levels.

Due to this result, it was necessary to develop new standards and apply discriminant analysis taking into account both educational ranges found. The range up to Incomplete Elementary School II (Group 1, n = 100) had a median of 22.00 (IQR = 16.8) and the range from Complete Elementary School II to Higher Education (Group 2, n = 402) had a median of 28 (IQR = 8). The IQR of the first group was twice as high as that of the second, indicating greater heterogeneity in the instrument scores.

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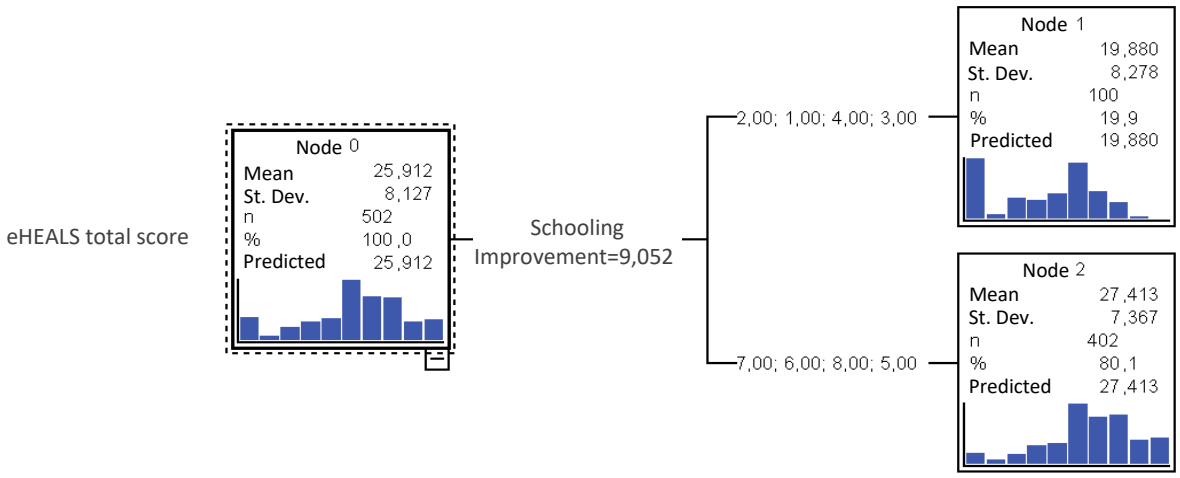
The division of standards into three bands was applied independently for both educational groups. Thus, the discriminant analysis of Group 1 resulted in MBox = 77.48; $p < 0.001$; $F(2, 14063.24) = 38.30$; $p < 0.001$; canonical correlation = 0.933; $\lambda = 0.13$; $\chi^2(2) = 167.63$; $p < 0.001$. The discriminant analysis managed to correctly classify 100% of the cases in Group 1. For Group 2, the results were MBox = 110.16; $p < 0.001$; $F(2, 282409.44) = 54.89$; $p < 0.001$; canonical correlation = 0.88; $\lambda = 0.22$; $\chi^2(2) = 593.36$; $p < 0.001$, making it possible to correctly discriminate 97% of the participants in the standardized ranges; the small difference corresponded to 6% that were in the moderate range, who were classified as in the low range. For all indicators, dividing the standards into two schooling level groups rendered the predictive and classification capacity more accurate.

Therefore, standardization of the eHEALS scores and stratification of the participants' EHL in future research must consider the schooling levels, as indicated in Figure 1.



Schooling level	Electronic Health Literacy		
	Low	Moderate	High
Up to Incomplete Elementary School	Up to 10	From 11 to 26	From 27 to 40
Complete Elementary School II up to Higher Education	Up to 24	From 25 to 32	From 33 to 40

Figure 1: Decision tree for standardizing the total score of the eHealth Literacy Scale (eHEALS), Brazilian version, according to schooling level. Piracicaba, SP, Brazil, 2019.

DISCUSSION

Through a rigorous standardization process, the current study showed the determination of cutoff points for classifying the eHEALS Brazilian version scale scores in adults, which must follow specific criteria according to schooling level, with the objective of not generating incorrect interpretations or information regarding people's EHL levels.

To date, none of the studies published with the eHEALS instrument at the global level have consistently evaluated these characteristics for the population to which the instrument was applied[9-13,26-32]. The authors who developed the scale did not establish cutoff points to differentiate individuals according to different EHL levels, only that higher scores on the scale indicated higher EHL levels[9]. Thus, this study contributes important findings to the scientific community, professionals and health teams to better categorize the EHL levels in the population researched/served, based on the constructs of the instrument. What has been published to the present day are adaptations of cutoff criteria used in other health literacy measuring instruments.

Swedish researchers have published two studies using eHEALS (the first in a sample of 323 Swedish adults with a mean age of 49 years old; and the second in a sample of 298 Arabic-speaking immigrants living in Sweden with a mean age of 41.8 years old), in which they proposed categorizing the instrument scores based on the same criteria used in the *European Health Literacy Survey Questionnaire* - 16 itens (HLS-EU-Q16) instrument[10,26]. To this end, they applied the eHEALS scale and considered the following scores: Inadequate EHL = from 8 to 20 (representing 50% of

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the total score for eHEALS), Problematic EHL = from 21 to 26 (representing 25% of the total score) and Sufficient EHL = from 27 to 40 (representing 25% of the total score for eHEALS)[10,26]. However, considering the differences in constructs between the HLS-EU-Q16 and eHEALS instruments, a direct transfer of cutoff criteria from one instrument to another without a more rigorous standardization process may generate measurement bias.

In a study carried out in Canada[28] at the University of Victoria with a sample of 36 employees with a mean age of 23.6 years old, the researchers tested four scoring categories for the instrument, in order to make inferences about the results of its scores. Initially, a "neutral" score was considered if a participant answered all eHEALS questions with option 3 ("Undecided"), thus adding up to 24 points. Two EHL categories were created on either side of this neutral value to rate the participants' confidence in their EHL abilities. Thus, individuals were classified as having "insufficient" EHL levels if the scores varied between 8 and 15.99, low EHL (scores between 16 and 23.99), moderate EHL (scores between 24 and 31.99) and high EHL (scores between 32 and 40)[28]. However, no more detailed analyses were carried out to test the validity of these criteria in the sample under study.

The analysis of the eHEALS mean values of items in the participants of the current study showed that item 8 ("I feel confident in using information from the Internet to make health decisions") presented the lowest mean. This characteristic was also observed in studies that used the adapted scale in other languages and countries[29-32], indicating that people do not feel as confident using information from the Internet to make health-related decisions. One of the hypotheses for this fact is the current phenomenon of infodemics, in which there is abundance of information circulating about health in different media, oftentimes contradictory and misleading, which causes confusion and distrust on the part of the population in selecting the best evidence source for decision-making[33].

Patient Reported Measures (PROMs) are frequently used by health professionals as a means to think about and implement new interventions or reorganize evidence-based care, with the objective of improving clinical outcomes and the patients' experience[34]. However, these professionals are not always familiar with applying instruments and oftentimes use them uncritically in their contexts, generating misinterpretations of the results obtained[35]. This can lead to faulty reporting and to wasted investments and resources due to absence of or few real sustainable improvements made. Furthermore, they can result in epistemic injustices, that is, discrimination and exclusion of some groups of people as experts or knowledge holders, which accentuates health disparities[36].

Study limitations

The limitation found in the study refers to characterization of the sample, which presented an advanced mean age and relatively low family incomes, which may have influenced the determination of scores based on the schooling levels. Therefore, future studies must be carried out to confirm the results herein described.

The current study brings about potential contributions to Nursing, given that Nursing professionals are in a privileged position to measure users' EHL levels and contribute to their improvement. To this end, it is imperative that they know and use valid and reliable cutoff criteria when applying the eHEALS instrument to the adult population, in order to support efficient health interventions that are appropriate to the users' profiles. In this sense, this study provides insights so that continuing health education programs can be designed with the objective of training nurses and other health professionals on when to use it, which tool (measure) to employ and, mainly, how to interpret data on EHL using eHEALS in a more appropriate way. Furthermore, it makes important contributions to the advancement of scientific knowledge, as it is one of the first studies published with the instrument that consistently evaluated criteria for standardizing its scores.

CONCLUSION

Standardization of the scores in the Brazilian version of eHEALS established three classification ranges for EHL, namely: low, moderate and high, which must be controlled by the respondents' schooling levels. It is recommended that future studies using eHEALS in Brazilian adults resort to the classifications presented in the current study.

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Conceptualization, F.L.M, K.L.M. e F.R.; methodology, F.L.M., K.L.M. e F.R.; software, F.R.; formal analysis, F.L.M, F.R.; investigation, F.L.M.; manuscript writing, F.L.M, K.L.M, H.A.C.S., V.V.B. e F.R.; manuscript review and editing, F.L.M, K.L.M, H.A.C.S., V.V.B. e F.R.; supervision, F.L.M. e F.R. All authors have read and agreed to the published version of the manuscript.