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ORIGINAL ARTICLE

FACTORS ASSOCIATED WITH HEALTH LITERACY IN PEOPLE WITH CHRONIC DISEASES

Luana dos Santos Dotta Pereira*
Letícia Waldomiro Nogueira**
Rita de Cassia Gengo e Silva Butcher***
Bianca Silva de Morais Freire****
Isabelle Cristinne Pinto Costa*****
Cristiane Giffoni Braga******
Ana Caroline da Costa*******

ABSTRACT

with chronic noncommunicable diseases in primary care. **Methods:** a cross-sectional study with 326 participants (70.86% female; 63.42±14.80 years). Health literacy was assessed by the Short Test of Functional Health Literacy in Adults (S-TOFHLA) between January and May 2022, based on the population of ten Family Health teams. Factors associated with health literacy were determined by a linear regression model, and the significance level adopted was 5%. **Results:** the mean total S-TOFHLA score was 65.30±25.66, and the regression model variables explained 34.46% of health literacy. There was a significant reduction in S-TOFHLA with age (β=-0.67; 95% CI=-0.87:-0.47) in people declared to be of yellow skin color, compared to those of black skin color (β=-16.99; 95% CI=-31.35:-2.61) and for those who did not receive health guidance (β=-3.32; 95% CI=-6.43:-0.21). There was a significant increase in S-TOFHLA in people who declared themselves white (β=6.07; 95%CI=0.452:11.69) and brown (β=6.84; 95%CI=0.36; 13.32) compared to black people, with longer years of education (β=1.68; 95%CI=1.07; 2.27). **Conclusions:** people with chronic diseases, who are yellow and have lower levels of education may have lower levels of health literacy.

Keywords: Health Literacy. Chronic Disease. Nursing. Socioeconomic Factors. Primary Healthcare.

INTRODUCTION

Health literacy (HL) is a multidimensional concept that encompasses a range of cognitive, affective, social and personal skills that determine both the motivation and the ability to access, understand and apply health information for daily decision-making and improving quality of life[1,2]. Particularly in relation to chronic diseases, HL appears as a determinant of patient empowerment and success in healthcare management[3,4].

However, the prevalence of low HL is recurrent in people with chronic diseases, such as hypertension and diabetes, ranging, respectively, between 57.2% and 95%[5,6]. Studies suggest that low HL is associated with worse health outcomes, such as negative impact on lifestyle, increased hospital readmissions, costs to the healthcare system and increased risk of mortality[7,8]. Furthermore, low HL can lead to impaired communication with the healthcare team and management of chronic disease in daily life[1].

Specifically, people with low HL tend to have difficulty performing more complex tasks, as well as seeking and understanding health-related information and accepting preventive care. As a consequence, there is an increased risk of exacerbation of chronic diseases and mortality[5]. In contrast, patients with higher levels of HL appear to have greater confidence

*PIBIC/FAPEMIG Scientific Initiation Scholarship. Nursing Undergraduate Student at Faculdade Wenceslau Braz (FWB). Itajubá, Minas Gerais. E-mail: luana.dotta.315@gmail.com ORCID iD: 0000-0001-8574-4401.
**Nursing Undergraduate Student at FWB. Itajubá, Minas Gerais. E-mail: leticia.lele2912@gmail.com ORCID iD: 0000-0002-3986-5736.
***Nurse. Post-Doctoral Degree. Assistant Professor at Florida Atlantic University Christine E Lynn College of Nursing, Boca Raton, Fl, United States of America. E-mail: rgengoesilva2021@health.fau.edu ORCID iD: 0000-0002-7307-2203.
****Nurse. Master's Degree in Nursing. Universidade Federal de Alfenas (UNIFAL). E-mail: bianca.morais10@hotmail.com ORCID iD: 0000-0002-3600-7648.
*****Nurse. Doctoral Degree in Nursing. Professor of the Undergraduate and Graduate Nursing Courses at UNIFAL. Alfenas, Minas Gerais. E-mail: isabelle.costa@unifal-mg.edu.br ORCID iD: 0000-0002-2611-8643.
******Nurse. Doctoral Degree in Nursing. Professor of the Undergraduate Nursing Course at FWB. Co-advisor PIBIC/FAPEMIG. Itajubá, Minas Gerais. E-mail: cristianegbraga@uol.com.br ORCID iD: 0000-0003-2168-191X.
*******Nurse. Master' Degree in Nursing in Adult Health.. Professor of the Undergraduate Nursing Course at FWB. Advisor PIBIC/FAPEMIG. Itajubá, Minas Gerais. E-mail: carolinea16@yahoo.com.br ORCID iD: 0000-0002-6936-6137.

in their information management skills, better self-care and treatment control, and greater attendance at appointments, leading to lower rates of complications, use of emergency services, and hospitalizations[9].

Regarding the factors that influence HL, sociodemographic and clinical characteristics, such as age, education, income, number of hospitalizations and time of disease onset, as well as cultural and social factors, can influence the level of HL in people with hypertension and coronary disease[4,5,10]. In this context, the identification of such factors can be the starting point for planning personalized and shared interventions according to individuals' needs and understanding, aiming to improve understanding skills and information processing as well as promoting better self-management of chronic disease[11]. Despite this importance, research assessing HL in people with chronic diseases in primary healthcare is still limited[12].

In this regard, assessing the level of HL in primary care in different locations can contribute to the reorganization of public health policies in order to welcome users, establish links and implement communication strategies that better involve the person in the healthcare system. In addition to the improvements highlighted, assessing the level of HL in primary care can provide improvements in effective communication between the team in comprehensive care for individuals, approaching the needs and realities of the community, considering the different levels of HL[13].

Thus, in accordance with the above, this study aimed to verify the association between the level of HL and the sociodemographic and clinical characteristics of people with chronic non-communicable diseases, treated in primary healthcare.

METHOD

This is an observational, cross-sectional study with a quantitative approach. The research is part of a project entitled "Nursing Process as a Predictor for Advanced Practice", funded by the *Fundação de Amparo à Pesquisa de Minas Gerais* (FAPEMIG). The report of this research was guided by the Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) checklist[14].

The study was carried out in the Family Health Strategy teams (FHSts) of the municipality of Itajubá, southern Minas Gerais, Brazil, distributed in both urban and rural areas. During the period in which the data were collected, the municipality had 17 FHSts, each with a nurse in charge. Data collection took place between January and May 2022.

It is estimated that there are around 17 thousand users with chronic non-communicable diseases, including diabetes, hypertension, cancer and cerebrovascular, renal, respiratory and cardiac diseases, in all FHSts in the municipality of Itajubá, according to data extracted from the Ministry of Health[15]. For the present study, data were collected from ten FHSts, selected for having a greater number of registered users with chronic non-communicable diseases.

Sample size calculation was performed by a statistician using Dimam 1.0 software, considering a finite population, standard error of 0.5, 95% confidence level and prevalence of inadequate HL in people with chronic non-communicable diseases when less than or equal to 33.3%[6,16]. Sample size was calculated as at least 318 participants.

People with one or more chronic non-communicable diseases registered in the selected FHSTs, aged 18 or over, who knew how to read and had preserved cognitive capacity, determined by a score greater than 20 on the Mini Mental State Examination (MMSE) were included in the study[17]. This criterion was adopted since impairment of cognitive functions could imply poor performance in the tests used for data collection, causing difficulties in understanding the task[16]. Individuals who reported having impaired visual or auditory abilities that would make data collection impossible were excluded. Individuals with communication difficulties, identified through observation by the researchers, were also excluded.

Potential study participants were identified from the FHST registry and were personally invited by the lead researcher to participate in the study. Those who accepted the invitation signed an Informed Consent Form and

responded to the MMSE. Individual meetings were held for the participants included in the study to apply the data collection instruments, described below.

Sociodemographic and clinical data were collected from participants' medical records or reports, through interviews. Independent variables for this study were age (in years), sex, self-reported skin color, marital status, number of years the participant attended formal education, employment status, monthly income, chronic diseases, family history, number of previous hospitalizations and visits to the emergency room or health unit due to exacerbation of chronic disease, number of medication tablets/day, smoking status, Body Mass Index (BMI) and previous health education. These independent variables were selected by the researchers based on the literature[1,4,5,10].

A dependent variable was the level of HL, assessed using the Short Test of Functional Health Literacy in Adults (S-TOFHLA), validated for use in Brazil[18]. This instrument was used to assess both reading comprehension and numeracy. Moreover, the S-TOFHLA is widely used in other studies with people with chronic diseases. It is a self-completion instrument that contains 36 reading comprehension items, organized into two passages, A and B.

Passage A contains information related to a gastrointestinal examination and Passage B refers to a term on the rights and responsibilities of a patient admitted to a hospital. Each passage has a gap (each gap corresponds to an item) and below each gap there are five or six word options, from which participants must select one to complete the sentence and give meaning to the phrase. For each word selected correctly, two points are awarded so that the total score is 72 points[10,16].

Numeracy assessment consists of presenting four cards for participants to interpret the information. Cards have questions related to the interpretation of the time to take the medication, the time and date of a scheduled appointment, the cost of a blood glucose test and the calculation of the interval between taking a medication, with the first card being a label of a medication. For each correct answer, seven points are awarded so that the numeracy part has a total score of 28 points[18].

The test is timed by the researcher without participants' knowledge. It is recommended that the reading comprehension part be completed in seven minutes and the numeracy part in five minutes. The total score of the S-TOFHLA ranges from 0 to 100 points. Based on the score obtained, the level of HL is classified as inadequate (0 to 53), marginal or borderline (54 to 66), or adequate (67 to 100). The instrument's internal consistency was 0.68 for the four numeracy items and 0.97 for the 36 items of the reading comprehension test[18].

The data were analyzed using Minitab® statistical software[19]. For categorical variables, absolute and relative frequencies were calculated. For quantitative variables, the mean, standard deviation, median, and minimum and maximum values were calculated. To determine the association of these sociodemographic and clinical characteristics (independent variables) with the total HL score (dependent variable), the multiple linear regression model was used. Based on literature on HL[1,4,5,10], the researchers selected the independent variables to be entered into the model. All sociodemographic and clinical variables were included in the regression model, except those that presented a variance inflation factor (VIF) above 5.0[20] (employment status and family history) and comorbidities that presented a low frequency of occurrence and, therefore, little variability in the sample (heart disease, respiratory disease, cancer, kidney disease and those classified as others). It is worth noting that participants with missing data (n=6) were not included in this analysis and the significance level adopted for all tests was 5%, with 95% confidence intervals.

It is worth mentioning that the research obtained a Consolidated Opinion of 5,136,913 from the *Faculdade Wenceslau Braz* Research Ethics Committee and that the researchers complied with all ethical procedures determined by Resolution 466/2012 of the Brazilian National Health Council.

RESULTS

The final study sample consisted of 326 participants, the majority of whom were female

(70.9%), with an average age of 63.4 years, with more than eight years of education, and the majority of whom were white and married. It was observed that 47.85% of participants had only one chronic condition and 39.88% had two, the most recurrent chronic diseases being hypertension and diabetes mellitus (Table 1).

Tabela 1. Características sociodemográficas e clínicas dos participantes. Itajubá, Minas Gerais, Brasil, 2022. (n=326)

Variables	
Age (years)	
Mean	63,4
Standard deviation	14,8
Education (years)	
Mean	8,7
Standard deviation	4,8
Monthly income[*] (*reais*)	
Mean	1.362,10
Standard deviation	1.121,52
Previous hospitalizations (number of times)	
Mean	1,76
Standard deviation	2,18
Visits to the emergency department or health unit (number of times)	
Mean	1,40
Standard deviation	2,55
Medications (number of tablets per day)	
Mean	4,17
Standard deviation	2,88
BMI[§]	
Mean	28,01
Standard deviation	5,13
Sex	
Female	231 (70,86%)
Male	95 (29,14%)
Skin color	
White	225 (69,02%)
Brown	62 (19,02%)
Black	30 (9,20%)
Yellow	5 (1,53%)
Did not answer	4 (1,23%)
Marital status	
Married/cohabiting	146 (44,79%)
Widowed	81 (24,85%)
Single	56 (17,18%)
Divorced/separated	41 (12,58%)
Did not answer	2 (0,61%)
Employment status	
Does not work and receives income	181 (55,52%)
Works and receives income	73 (22,39%)
Unemployed	44 (13,50%)
Works and does not receive income	24 (7,36%)
Student	4 (1,23%)
Chronic diseases	
Hypertension	222 (68,10%)
Diabetes	155 (47,55%)
Others**	83 (25,46%)
Heart disease	45 (13,80%)
Respiratory disease	23 (7,06%)
Cancer	7 (2,15%)
Kidney disease	1 (0,31%)
Family history of chronic disease	
Yes	256 (78,53%)
No	69 (21,17%)

Did not answer	1 (0,31%)
Smoking	
Non-smoker	167 (51,23%)
Former smoker	125 (38,34%)
Smoker	34 (10,43%)
Health guidance ‡	
Yes	267 (81,90%)
No	54 (16,56%)
Did not answer	5 (1,53%)

*Current wage at the time of data collection: R$ 1,212.00; §BMI - Body Mass Index; **Others: dyslipidemia, gastritis, cerebrovascular diseases (such as stroke, venous thrombosis), hypothyroidism, neuropsychiatric disorders (such as depression), musculoskeletal and joint diseases (such as fibromyalgia, arthritis); ‡Health guidance: refers to any guidance or information received about health, exams and treatments in general and not specifically about chronic disease.

Regarding HL, the mean total score of the S-TOFHLA was 65.30 ± 25.66, while the mean score of the reading comprehension part was 41.38 ± 23.22 and of the numeracy part was 23.92 ± 6.03. It was identified that 24% of the participants had adequate HL, 39.57% had borderline HL and 13.19% had inadequate HL.

Each additional year of age decreased the score by -0.67 (95% CI = -0.87; -0.47). Those with yellow skin color had a decrease of -16.98 points (95% CI = -31.35; -2.61) and those with white and brown skin color obtained an increase in the score of 6.07 (95% CI = 0.45; 11.69) and 6.84 (95% CI = 0.36; 13.32), respectively. Those who did not receive health guidance had a reduction in score of -3.32 (95% CI = -6.43; -0.21). Each additional year of education increased the score by 1.67 (95% CI = 1.07; 2.27). The regression model variables explained 34.46% of the variability in the HL score (Table 2).

Table 2. Factors associated with health literacy. Itajubá, Minas Gerais, Brazil, 2022 (n = 326)

Variables	Regression coefficient	Standard error	95% CI* £min – 95% CI* ¥max	p-value†
Age (years)	-0.670	0.101	(-0.870; -0.471)	**<0.001**
Education (years)	1.676	0.303	(1.079; 2.272)	**<0.001**
Monthly income (*reais*)	0.002	0.001	(0.000; 0.004)	**0.046**
Previous hospitalizations (number of times)	-0.166	0.357	(-0.869; 0.536)	0.642
Visits to the emergency room or health unit (number of times)	-0.627	0.402	(-1.418; 0.164)	0.120
Medications (number of tablets per day)	-0.014	0.234	(-0.476; 0.447)	0.951
BMI§	0.291	0.211	(-0.123; 0.707)	0.168
Sex (reference€: female)	1.557	1.358	(-1.115; 4.230)	0.253
Skin color (reference€: black)				
Yellow	-16.986	7.303	(-31.359; -2.613)	**0.021**
White	6.073	2.856	(0.451; 11.694)	**0.034**
Brown	6.845	3.291	(0.369; 13.321)	**0.038**
Marital status				
Married/cohabiting	2.676	1.877	(-1.019; 6.371)	0.155
Divorced/separated	-1.122	2.765	(-6.563; 4.319)	0.685
Single	-3.376	2.534	(-8.364; 1.611)	0.184
Hypertension (reference€: no)	0.181	1.410	(-2.595; 2.957)	0.898
Diabetes mellitus (reference€: no)	-0.067	1.261	(-2.549; 2.414)	0.957
Smoking				
Former smoker	1.354	1.942	(-2.469; 5.177)	0.486
Smoker	-4.785	2.687	(-10.074; 0.504)	0.076
Health guidance‡, (reference €: yes)	-3.324	1.580	(-6.434; -0.214)	**0.036**

*95% CI - Confidence Interval; £Min. - Minimum; ¥Max. - Maximum; †p - Significance level; §BMI - Body Mass Index; ‡Health guidance: refers to any guidance or information received about health, exams and treatments in general and not specifically about the chronic disease; €Reference: the variable that is compared.

DISCUSSION

This research indicates that HL is associated with characteristics such as age, education, skin color, income and receipt of health guidance. The mean HL score in this study was 65.30 ± 25.66, and approximately half of study participants had adequate HL. Our findings differ from those

observed in the literature, which demonstrates a lower frequency of adequate HL in individuals with chronic diseases in general[1,4,21-22].

A reduction in HL levels was observed in older individuals who declared themselves to have yellow skin color and who did not acknowledge having received health guidance. On the other hand, white and brown individuals, with higher levels of education and higher per capita income, presented higher HL levels. Similarly, a cross-sectional study showed that male gender, advanced age, education of four years or less, low socioeconomic status and those who reported difficulty in understanding health guidelines were associated with low HL[16].

The literature is consensual in showing that older individuals tend to have marginal or inadequate performance in the S-TOFHLA, associated with reduced cognitive abilities that may limit the ability to access and understand health information[23-24]. Hence, a cross-sectional study that aimed to assess HL and its dimensions in 384 older adults found that low levels of HL are associated with reduced cognitive capacity. The authors point out that factors related to aging, such as hearing and visual loss, can negatively affect HL[25].

An investigation conducted in the context of primary healthcare, with 439 women assisted by FHSt, found that brown or black women were 8% more likely to have low HL compared to self-declared white women[26]. Taken together, these results suggest that social and structural determinants affect the HL of people of different races, despite the Brazilian healthcare system advocating universal access and comprehensive care[27-28].

Although low levels of HL affect people from all social groups, they disproportionately impact vulnerable populations, such as racial/ethnic minorities who, due to social, political, structural and historical forces, are at a disadvantage in relation to health and care, reflected in high rates of chronic diseases, complications, use of healthcare services, worse health outcomes, greater morbidity and premature mortality[28].

Concerning education, the findings of this study converge with the literature in which individuals with higher levels of education are less likely to have limited HL when compared to individuals with few years of education. Furthermore, it is evident that individuals with higher educational levels are able to manage their healthcare autonomously and make appropriate decisions when navigating the healthcare system, as they communicate more easily and understand the information transmitted by healthcare professionals[6, 11, 24].

Similarly, a study that assessed the HL of 264 older adults with high blood pressure treated at FHSt showed that education was associated with HL, such that individuals with up to four years of formal education obtained lower scores on the S-TOFHLA. The authors of the aforementioned study emphasize that this may occur because HL is closely linked to skills developed in the school environment, such as reading, interpretation and numerical operations[4].

On the other hand, it is observed that some researchers state that education level should not be analyzed by itself as a criterion for inferring HL levels, given that users with higher educational levels may have difficulties with terminology and procedures related to the health context[24,26]. This may be related to the fact that HL goes beyond reading and writing skills, as it encompasses a series of individual and social factors, such as cultural and conceptual knowledge that are essential for individuals with chronic disease to participate in therapeutic management. Furthermore, the high level of complexity of the disease and self-care depend not only on individual capacity, but also on the demands imposed by society and the healthcare system[22].

The data indicate that the results regarding per capita deserve attention, as well as the value of the confidence interval when rounded approaches zero, although the value is less than 0.05. Given this result, it is suggested that future research be designed to investigate the relationship between income and HL in emerging countries, such as Brazil. In the international context, income or financial situation have been related to low demand for healthcare services and low HL[28].

In relation to health guidance, the results are consistent with the scientific literature, which shows that individuals who receive some type of guidance, whether from doctors, nurses, nursing technicians or community health agents, obtained better levels of HL, whereas those who reported the absence of health guidance achieved low levels of HL[3,4].

Another article also shows that patients diagnosed with chronic cardiovascular diseases who have low HL have difficulty understanding and assimilating medical advice, associated with patients' difficulty in communicating, thus being unable to clarify doubts, express concerns and participate in the decision of the clinical treatment to be adhered to[16]. Furthermore, the lack of skills of healthcare professionals in identifying individuals with low HL and adapting their communication to meet patients' specific needs can be a barrier to a process of self-management of the disease[16, 22].

Currently, there is a broad discussion in the literature about the use of applications, digital tools, social media, telemonitoring as health monitoring and management strategies in patients with chronic diseases, as it facilitates access to information[29]. A practical intervention study with hypertensive patients showed that remote educational interventions can contribute to improving HL levels in patients, facilitating knowledge of disease, medication adherence, adoption of healthier lifestyle habits and lifestyle changes. However, professionals who use these tools need to be prepared and develop skills for such action. Another important factor is that these tools must provide adequate guidance that is consistent with the reality of each individual[3].

This study has limitations that need to be considered, since the cross-sectional design does not allow for the establishment of causal relationships between sociodemographic and clinical factors and HL. Another limitation was the inclusion of only people who knew how to read, since the instruments used were self-administered. This fact may limit the generalization of our results, since people who cannot read may present greater social vulnerability and lower HL. Furthermore, this study included people with different chronic diseases. Although hypertension and diabetes were the most frequent diagnoses, the inclusion of less common conditions may have influenced the results regarding HL and the perception of access to health guidance. On the other hand, data were collected from people served by ten FHSts, which may contribute to the external validity of our results.

CONCLUSION

Within the scope of this study, it is concluded that age, skin color, formal education, per capita income and health guidelines were associated with HL, suggesting that sociodemographic factors may interfere with the level of understanding of health information. Therefore, it is important to recognize that people with chronic diseases, who are yellow, have lower education and income, may have lower levels of HL and possible worsening of their chronic condition, triggered by difficulties in continuing care plans. Therefore, the use of clear and accessible information is essential to ensure quality care and facilitate the understanding, use and health decision-making of people with chronic diseases treated in primary care.

FATORES ASSOCIADOS AO LETRAMENTO EM SAÚDE EM PESSOAS COM DOENÇAS CRÔNICAS

RESUMO

Objetivo: verificar a associação do Letramento em Saúde com características sociodemográficas e clínicas em pessoas com doenças crônicas não transmissíveis na atenção primária. **Métodos:** estudo transversal com 326 participantes (70.86% do sexo feminino; 63.42±14.80 anos); o letramento em saúde foi avaliado pelo *Short Test of Functional Health Literacy in Adults* (S-TOFHLA) entre janeiro e maio de 2022, com base na população de 10 equipes de saúde da família. Fatores associados ao letramento em saúde foram determinados por modelo de regressão linear e o nível de significância adotado foi de 5%. **Resultados:** o escore total médio do S-TOFHLA foi 65.30±25.66 e as variáveis do modelo de regressão explicaram 34,46% do letramento em saúde. Houve redução significativa do S-TOFHLA com a idade (β=-0,67; IC95%=-0,87:-0,47), em pessoas declaradas de cor amarela, comparadas às de cor preta (β=-16,99; IC95%=-31,35:-2,61) e para aquelas que não receberam orientações em saúde (β=-3,32; IC95%=-6,43:-0,21). Houve aumento significativo do S-TOFHLA em pessoas declaradas brancas (β=6,07; IC95%=0,452:11,69) e pardas (β=6,84; IC95%=0,36; 13,32) em comparação às pretas, com maior tempo de escolaridade (β=1,68; IC95%=1,07; 2,27). **Conclusões:** pessoas com doenças crônicas, de cor amarela e menor escolaridade, podem apresentar níveis mais baixos de letramento em saúde.

Palavras-chave: Letramento em saúde. Doença crônica. Enfermagem. Fatores socioeconômicos. Atenção primária à saúde.

FACTORES ASOCIADOS CON LA ALFABETIZACIÓN EN SALUD EN PERSONAS CON ENFERMEDADES CRÓNICAS

RESUMEN

Objetivo: verificar la asociación de la Alfabetización en Salud con características sociodemográficas y clínicas en personas con enfermedades crónicas no transmisibles en atención primaria. **Métodos**: estudio transversal con 326 participantes (70.86% del sexo femenino; 63.42±14.80 años); la alfabetización en salud fue evaluada por el *Short Test of Functional Health Literacy in Adults* (S-TOFHLA) entre enero y mayo de 2022, basado en la población de 10 equipos de salud familiar. Los factores asociados con la alfabetización en salud fueron determinados por el modelo de regresión lineal y el nivel de significancia adoptado fue el 5%. **Resultados**: el puntaje medio total del S-TOFHLA fue 65.30±25.66 y las variables del modelo de regresión explicaron 34,46% de la alfabetización en salud. Hubo reducción significativa de S-TOFHLA con la edad (β=-0,67; IC95%=-0,87:-0,47), en personas declaradas de color amarillo, comparadas a las de color negro (β=-16,99; IC95%=-31,35:-2,61) y para aquellas que no recibieron orientación en salud (β=-3,32; IC95%=-6,43:-0,21). Hubo aumento significativo del S-TOFHLA en personas declaradas blancas (β=6,07; IC95%=0,452:11,69) y pardas (β=,84; IC95%=,36; 13,32) en comparación con las negras, con mayor tiempo de escolaridad (β=1,68; IC95%=1,07; 2,27). **Conclusiones**: personas con enfermedades crónicas, de color amarillo y menor escolaridad, pueden presentar niveles más bajos de alfabetización en salud.

Palabras clave: Alfabetización en salud. Enfermedad crónica. Enfermería. Factores socioeconómicos. Atención Primaria de Salud.

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Corresponding author: Luana dos Santos Dotta Pereira. Rua José Maria Silveira Campos 91 – Piranguçu, Minas Gerais. CEP: 37511-000. Telefone (35) 99713-2387. E-mail: luana.dotta.315@gmail.com

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