

HEALTH LITERACY AND PHARMACOTHERAPY ADHERENCE AMONG CHRONIC KIDNEY DISEASE PATIENTS IN PRE-DIALYSIS CARE

Letramento em saúde e adesão a medicação de doentes renais crônicos em tratamento pré-dialítico

Letramiento en salud y adhesión al medicamentos de pacientes renales crónicos en tratamiento pre dialítico

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How to cite this article:

Leão NCS, Canhestro MR, Milagres LMR, Oliveira PM, Moraes KL, Brasil VV. Health literacy and pharmacotherapy adherence among chronic kidney disease patients in pre-dialysis care. 2021 jan/dez; 13:1610-1617. DOI: <http://dx.doi.org/0.9789/2175-5361.rpcfo.v13.10792>.

ABSTRACT

Objective: to evaluate the relationship between health literacy and adherence to pharmacotherapy in chronic kidney disease patients in pre-dialysis care. **Method:** cross-sectional study using the Health Literacy Questionnaire to assess literacy and the Morisky Scale to evaluate pharmacotherapy adherence. **Results:** a total of 153 patients participated, with 84 (55.3%) showing non-adherence to pharmacotherapy. Regarding the Health Literacy Questionnaire, there was no statistically significant difference in seven constructs. In two other constructs, in which there was a statistically significant difference, pharmacotherapy-adherent patients exhibited greater health literacy. **Conclusion:** in the studied population, pharmacotherapy-adherent patients tend to have greater health literacy.

DESCRIPTORS: Health literacy; Knowledge; Chronic kidney failure; Patient participation; Health education.

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RESUMO

Objetivo: analisar a associação entre as condições de letramento em saúde e adesão a medicação de doentes renais crônicos em tratamento pré-dialítico. **Método:** estudo transversal com pacientes em tratamento pré-dialítico da doença renal crônica. O letramento foi avaliado com o *Health Literacy Questionnaire* e a adesão a medicação foi avaliada pela escala de *Morisky*. **Resultados:** participaram 153 pacientes sendo que 84 (55,3%) apresentou não adesão à medicação. Em relação ao *Health Literacy Questionnaire*, em sete constructos não houve diferença estatística significativa. Em outros dois constructos em que houve diferença estatisticamente significativa, os pacientes aderidos à medicação apresentaram melhor letramento. **Conclusão:** na população estudada pacientes que possuem adesão à medicação tendem a melhor letramento em saúde.

DESCRITORES: Letramento em saúde; Conhecimento; Insuficiência renal crônica; Participação do paciente; Educação em saúde.

RESUMEN

Objetivo: analizar la asociación entre las condiciones de letramiento en salud y adhesión al medicamentos de pacientes renales crónicos con tratamiento pre dialítico. **Metodología:** estudio transversal con pacientes en tratamiento pre dialítico de la enfermedad renal crónica. El letramiento fue evaluado con el *Health Literacy Questionnaire* y la adhesión al medicamento fue evaluado por la escala de *Morisky*. **Resultados:** participaron 153 pacientes, siendo que 84 (55,3%) no adhirieron al medicamentos. En relación al *Health Literacy Questionnaire*, en siete constructos no hubo diferencia estadísticamente significativa, en otros dos constructos en que hubo diferencia estadísticamente significativa, los pacientes que adhirieron al medicamentos presentaron mejor letramiento. **Conclusión:** en la población estudiada los pacientes que poseen adhesión al tr medicamentos tienden a tener mejor letramiento.

DESCRITORES: Alfabetización en salud; Conocimiento; Insuficiéncia renal cronica; Participación del paciente; Educacion em salud.

INTRODUCTION

Health literacy (HL) is being recognized as important for public health worldwide due to the rapid accumulation of evidence associating it with health-related measures.¹

HL is defined as the cognitive and social skills that determine an individual's motivation and ability to access, understand, and use information to promote and maintain good health.²

Studies point out that HL is inadequate all over the world and that individuals who have less information, less access to online health information, are not able to evaluate the quality of information from different sources, and use less preventive services and more high complexity services, increasing health care costs.² In contrast, adequate HL is associated with positive health outcomes, and assessing it has been a growing concern for researchers.¹

Great emphasis has been given to the assessment of HL in chronically ill patients, mainly because they are the ones who have more limited literacy and a greater need to understand the orientations provided by the team, since knowing one's health condition is essential for self-management.³

An important aspect of the treatment of the chronically ill is adherence to drug therapy. The association between HL and medication adherence was evaluated in a study that identified the existence of an association between the two variables and pointed out the need to evaluate HL for the development of strategies that impact adherence.⁴ In the case of patients with chronic kidney disease (CKD), medication adherence is an essential part of the treatment and when appropriate, is able to stop disease progression.⁵

Considering the large number of factors that influence patients' treatment adherence behavior, assessing it is considered a great challenge for professionals. The literature proposes a variety of methods, classifying them as "direct" and "indirect". The direct methods are those that use blood or urine analysis, seeking to detect the presence of substances that prove the use of the medication, and as an indirect method, self-report stands out, which has been widely used.⁶

As for the assessment of HL, studies have shown that it is something that can be quantified. Aiming to develop a multidimensional instrument, the Australian group of studies on HL proposed the Health Literacy Questionnaire (HLQ), which assesses nine distinct areas related to HL⁷ and has been widely used worldwide. In a literature review on the importance of HL in patients with CKD, the authors conclude that these are still scarce being an important area for knowledge development.¹

Thus, this study aims to analyze the association between health literacy conditions and medication adherence of chronic renal patients in pre-dialysis treatment.

METHOD

This is a descriptive, cross-sectional study conducted in a nephrology outpatient clinic of a university hospital from April to October 2017.

In this place, patients with CKD from stage one to five are not dialyzed. Patients who met the following inclusion criteria were selected: older than 18 years, having CKD in pre-dialysis treatment and using at least one oral medication at the time of the interview. Patients with psychiatric and/or neurodegenerative diseases and those taking medication that impaired cognition were excluded.

Data collection was performed by the researchers through interviews using the following instruments:

- Patient characterization questionnaire: sociodemographic and health condition characterization.
- Health Literacy Questionnaire (HLQ): prepared by the group of researchers from Deakin University Australia in English language containing 44 items divided into nine scales that address: understanding and support from health professionals; sufficient information to take care of health; active health care; social support for health; evaluation of health information; ability to actively engage with health professionals; navigating the health system; ability to find good health information; understanding health information and knowing what to do. Question

responses are scored five points on a scale ranging from “always difficult” to “always easy” and four points on a scale ranging from “strongly agree” to “strongly disagree”.⁷ The instrument was adapted into Brazilian Portuguese and renamed HLQ-Br.⁸

The HLQ does not provide an overall score for the questionnaire, but rather scores for each of the nine scales separately. This score indicates the strengths and needs of each person in relation to their health literacy. It is calculated by summing each item of the scales and dividing this value by the number of items, and the value is presented as the average score. Higher scores indicate better LF.

- The Morisky Medication Taking Behavior Scale:⁹ is a medication adherence assessment tool composed of four questions that identify attitudes and behaviors regarding medication use. To answer them, the patient was asked to base his or her behavior regarding medication intake in the two weeks prior to the interview. The items have dichotomous answers (YES/NO) and classified the patient as having high adherence (all NO answers), medium adherence (one or two YES answers), and low adherence (three or four YES answers). For each negative response, respondents received one point. Those who scored less than or equal to three, as proposed by the authors of the test, were classified as “non-adherent to medication through self-report”.

In the data analysis, the sociodemographic variables were analyzed by descriptive statistics. In the description of quantitative variables and construct items, measures of position, central tendency, and dispersion were used, such as the bootstrap percentile interval with 95% confidence.¹⁰ To compare the indicators with the sociodemographic variables the Kruskal Wallis, Mann-Whitney, and Spearman correlation tests were used.¹¹

The project was approved by the Comitê de Ética em Pesquisa (COEP) of the Federal University of Minas Gerais, opinion N01.977.799 of 03/22/2017.

RESULTS

We interviewed 153 patients, mostly females, with a mean age of 54.98 years (SD = 18.50). Most patients (65.8%) had personal income of one to three minimum wages and the same happened with family income, Table 1.

As for education, 60 (39.5%) had four to eight years of schooling, followed by 33 (21.7%) with more than 12 years and 27 (17.8%) with 10 to 12 years of schooling. In reference to health problems, 148 (97.4%) reported having CKD, and five, although they also had this diagnosis, did not identify it. All reported having some type of comorbidity, Table 1. The average number of types of medications used by patients was five per day.

Table 1 - Sociodemographic and clinical characteristics of patients, Belo Horizonte, MG, Brazil, 2017

Variables	N	%	
Gender	Female	81	51,0%
	Male	75	49,0%
Age Group	18 to 25	17	12,5%
	26 to 40	13	8,49%
	41 to 64	70	45,75%
	Above 65	53	34,64%
	Less than or equal to the minimum wage*	46	30,3%
Personal Income	From 1 to 3 minimum wages	100	65,8%
	Greater than or equal to 3 minimum wages	6	3,9%
	From 1 to 3 minimum wages	15	75,2%
	Greater than or equal to 3 minimum wages	21	13,7%
	0	10	6,6%
	From 1 to 3	20	13,2%
	From 4 to 8	60	39,5%
	9 w	3	1,3%
	From 10 to 11	27	17,8%
	≥ 12	33	21,7%
	Hypertension	68	44,7%
	Other	55	36,2%
	Heart problems	35	23,0%
Hypertension and diabetes	30	19,7%	
Diabetes	15	9,9%	
Depression or other mental condition	10	6,6%	
Cancer	10	6,6%	
Healthy	0	0,0%	

*minimum wage of R\$ 937.00

Regarding the assessment of medication adherence, most patients showed low or medium adherence and, therefore, were considered non-adherent to medication (Table 2).

Table 2 - Medication adherence assessment of chronic renal patients in pre-dialysis treatment, Belo Horizonte, MG, Brazil, 2017

Variables		N	%
You have forgotten to take your medication	No	87	57,2%
	Yes	65	42,8%
Careless with the timing of taking medication	No	101	66,4%
	Yes	51	33,6%
When you feel well, you stop taking the medication	No	130	85,5%
	Yes	22	14,5%
When you feel bad, you stop taking your medication	No	122	80,3%
	Yes	30	19,7%
Adhesion Evaluation	Not joined	84	55,3%
	Joined	68	44,7%

The descriptive analysis of the items referring to the first part of the questionnaire was performed by analyzing each construct. Items with confidence intervals strictly greater than 2.5 indicate a tendency to agree, and items with intervals

strictly smaller than 2.5 indicate a tendency to disagree. It was possible to observe that in the construct “I feel understood and supported by health professionals”, patients tended to agree with all items, but those adherent to medication tended to agree more with these items. In the construct “I have enough information to manage my health”, patients tended to agree with all items, but those classified as medication adherent tended to agree more than the others, Table 3.

On the construct “I actively manage my health”, patients tended to agree with all items, but those classified as medication adherents tended to agree more with the items on this construct, with the exception of question nine (“I make plans about what I need to do to be healthy”), Table 3.

In the construct “Social support for health”, patients tended to agree with all items, however, in this construct, non-adherents tended to agree more, with the exception of question 5 (“When I feel sick, the people around me really understand what I am going through”) and question 11 (“If I need help, I have many people I can count on”), Table 3.

On the construct “Health information assessment”, patients tended to agree with all items. Regarding adherence, those adhering to medication tended to agree more, with the exception of question 4 (“I compare health information obtained from different sources”), Table 3.

Table 3 - Descriptive analysis of the items of the HLQ-Br - Part 1 and medication adherence assessment of chronic renal patients in pre-dialysis treatment, Belo Horizonte, MG, Brazil, 2017 (n=153)

Construct	Item	General			Not joined			Joined		
		Average	D.P.	I.C.-95% ¹	Average	D.P.	I.C.-95% ¹	Average	D.P.	I.C.-95% ¹
I feel understood and supported by health professionals	Q2	3,09	0,88	[2,95; 3,24]	3,00	0,92	[2,80; 3,19]	3,21	0,82	[3,00; 3,38]
	Q8	2,95	0,95	[2,81; 3,10]	2,91	0,98	[2,69; 3,11]	3,02	0,92	[2,81; 3,21]
	Q17	3,28	0,74	[3,17; 3,40]	3,24	0,83	[3,05; 3,41]	3,34	0,61	[3,19; 3,47]
	Q22	3,20	0,78	[3,09; 3,33]	3,17	0,85	[2,99; 3,36]	3,25	0,68	[3,07; 3,40]
I have enough information to manage my health	Q1	3,15	0,69	[3,04; 3,25]	3,14	0,68	[3,00; 3,27]	3,15	0,72	[2,99; 3,31]
	Q10	3,17	0,80	[3,05; 3,29]	3,12	0,83	[2,94; 3,30]	3,24	0,76	[3,06; 3,40]
	Q14	2,99	0,88	[2,84; 3,13]	2,92	0,92	[2,73; 3,11]	3,09	0,82	[2,88; 3,27]
	Q23	3,06	0,83	[2,93; 3,18]	3,01	0,87	[2,82; 3,19]	3,12	0,78	[2,93; 3,31]
I actively manage my health	Q6	3,07	0,84	[2,95; 3,21]	3,04	0,88	[2,85; 3,24]	3,12	0,78	[2,94; 3,31]
	Q9	2,97	0,93	[2,82; 3,13]	2,99	0,93	[2,80; 3,19]	2,96	0,94	[2,74; 3,16]
	Q13	3,21	0,76	[3,09; 3,32]	3,16	0,84	[2,96; 3,32]	3,28	0,64	[3,12; 3,43]
	Q18	2,99	0,87	[2,85; 3,13]	3,01	0,83	[2,83; 3,18]	2,96	0,92	[2,74; 3,18]
	Q21	3,13	0,80	[3,00; 3,26]	3,04	0,87	[2,85; 3,21]	3,25	0,70	[3,09; 3,41]
Social health support	Q3	3,22	0,77	[3,11; 3,34]	3,25	0,79	[3,07; 3,42]	3,19	0,76	[3,00; 3,37]
	Q5	2,93	0,89	[2,80; 3,08]	2,91	0,94	[2,71; 3,10]	2,97	0,83	[2,77; 3,15]
	Q11	3,15	0,80	[3,03; 3,28]	3,13	0,85	[2,96; 3,30]	3,18	0,75	[3,00; 3,35]
	Q15	3,15	0,93	[3,01; 3,29]	3,26	0,88	[3,08; 3,44]	3,02	0,97	[2,78; 3,24]
Health Information Evaluation	Q19	3,35	0,71	[3,23; 3,45]	3,39	0,62	[3,26; 3,54]	3,29	0,81	[3,10; 3,49]
	Q4	2,70	1,00	[2,54; 2,85]	2,73	0,99	[2,51; 2,93]	2,66	1,02	[2,41; 2,91]
	Q7	2,88	1,02	[2,71; 3,05]	2,85	1,06	[2,63; 3,06]	2,93	0,98	[2,69; 3,15]
	Q12	2,77	1,01	[2,62; 2,92]	2,74	1,00	[2,52; 2,94]	2,81	1,03	[2,59; 3,04]
	Q16	2,82	0,95	[2,66; 2,96]	2,80	0,93	[2,61; 2,99]	2,84	0,99	[2,60; 3,07]
	Q20	2,94	0,96	[2,78; 3,09]	2,89	1,03	[2,69; 3,10]	3,00	0,86	[2,79; 3,19]

The descriptive analysis of the items referring to the second part of the questionnaire was also performed considering each construct. Items with confidence intervals strictly greater than 3.0 indicate a tendency toward ease, and items with intervals strictly smaller than 3.0 indicate a tendency toward difficulty. Thus, it can be observed that in the construct “Ability to actively engage with health care professionals” patients tended to find it easy with all items and that those adhering to medication tended to find it easier, Table 4.

In the construct “Navigating the health care system”, patients tended to have greater ease with questions 11 - part 2 (“Deciding which health care professional you need to see”), question 13 - part 2 (“Making sure you find the right place to get the health care you need”) and question 19 - part 2 (“Deciding which care is best for you”). With the exception

of the latter, medication adherents had greater ease with the items in this construct, Table 4.

In the construct “Ability to find good health information”, patients showed less facility with question 18 - part 2 (“Obtaining health information on your own”). Regarding adherence, those adhering to medication tended to have greater ease with the items of this construct, Table 4.

In the construct “Understands health information well enough to know what to do”, patients had greater difficulty with question 17 (“Read and understand all the information on package inserts”) and facility with questions 9 (“Follow health care providers’ instructions precisely”) and 21 (“Understand what health care providers are asking you to do”). Medication adherents also tended to agree more with the items in this construct, Table 4.

Table 4 - Descriptive analysis of the items of the HLQ-Br - Part 2 and medication adherence assessment of chronic renal patients in pre-dialysis treatment, Belo Horizonte, MG, Brazil, 2017

Construct	Item	General			Not joined			Joined		
		Average	D.P.	I.C.-95% ¹	Average	D.P.	I.C.-95% ¹	Average	D.P.	I.C.-95% ¹
Ability to actively engage with health care professionals	Q2	3,79	0,97	[3,63; 3,94]	3,69	1,04	[3,46; 3,91]	3,91	0,88	[3,69; 4,12]
	Q4	3,78	1,22	[3,57; 3,96]	3,73	1,23	[3,46; 3,98]	3,84	1,22	[3,54; 4,10]
	Q7	3,96	1,07	[3,80; 4,13]	3,89	1,12	[3,66; 4,14]	4,04	1,01	[3,79; 4,27]
	Q15	3,57	1,30	[3,37; 3,78]	3,37	1,35	[3,07; 3,68]	3,82	1,18	[3,54; 4,09]
	Q20	3,77	1,29	[3,57; 3,97]	3,62	1,42	[3,33; 3,91]	3,96	1,09	[3,68; 4,19]
Navigating the Health System	Q1	2,84	1,27	[2,65; 3,04]	2,81	1,23	[2,55; 3,08]	2,88	1,32	[2,57; 3,21]
	Q8	3,21	1,42	[2,97; 3,42]	3,05	1,44	[2,75; 3,35]	3,41	1,39	[3,09; 3,74]
	Q11	3,49	1,35	[3,28; 3,69]	3,48	1,38	[3,17; 3,75]	3,52	1,32	[3,18; 3,81]
	Q13	3,59	1,29	[3,37; 3,79]	3,45	1,40	[3,14; 3,74]	3,75	1,13	[3,49; 4,00]
	Q16	3,05	1,33	[2,84; 3,26]	2,95	1,36	[2,67; 3,24]	3,18	1,29	[2,90; 3,47]
	Q19	3,53	1,31	[3,34; 3,72]	3,54	1,31	[3,24; 3,83]	3,53	1,31	[3,24; 3,84]
Ability to find good health information	Q3	3,42	1,30	[3,23; 3,62]	3,42	1,30	[3,16; 3,69]	3,43	1,30	[3,12; 3,75]
	Q6	3,09	1,34	[2,88; 3,30]	2,99	1,36	[2,69; 3,27]	3,22	1,33	[2,90; 3,56]
	Q10	3,24	1,42	[3,03; 3,47]	2,91	1,47	[2,58; 3,21]	3,65	1,24	[3,35; 3,93]
	Q14	3,43	1,22	[3,24; 3,61]	3,24	1,30	[2,96; 3,50]	3,66	1,09	[3,41; 3,90]
	Q18	2,77	1,47	[2,53; 2,98]	2,51	1,44	[2,20; 2,79]	3,09	1,45	[2,72; 3,43]
Understands enough health information to know what to do	Q5	3,21	1,54	[2,97; 3,45]	3,02	1,57	[2,70; 3,37]	3,44	1,48	[3,06; 3,78]
	Q9	3,44	1,25	[3,23; 3,63]	3,24	1,31	[2,95; 3,51]	3,69	1,12	[3,43; 3,94]
	Q12	3,11	1,47	[2,87; 3,34]	2,92	1,52	[2,61; 3,24]	3,34	1,38	[3,00; 3,68]
	Q17	2,47	1,48	[2,25; 2,70]	2,20	1,42	[1,89; 2,51]	2,81	1,50	[2,44; 3,16]
	Q21	3,97	1,12	[3,78; 4,15]	3,96	1,10	[3,73; 4,20]	3,99	1,15	[3,71; 4,24]

Among the nine scales of the HLQ-Br those that were significantly associated with medication adherence were: ability to find good health information and understanding health information and knowing what to do, Table 5.

Table 5 - Association of HLQ-Br items with medication adherence of chronic renal patients in pre-dialysis treatment, Belo Horizonte, 2017 (n=153)

Indicators	Adhesion Evaluation	Average	E.P.	P-value
		3,39	0,11	
Ability to find good health information	Not joined	3,00	0,11	0,010
	Joined	3,41	0,11	
Understands enough health information to know what to do	Not joined	3,00	0,11	0,009
	Joined	3,40	0,12	

DISCUSSION

The results allowed an approximation of the HL assessment of the studied population and pointed out characteristics that can be useful in planning assistance. We observed a practically equal distribution between genders and most patients were young adults followed by the elderly. In studies carried out in Brazil, a high frequency of inadequate HL was observed in adults between 19 and 59 years old and in the elderly over 60 years old.¹²⁻¹³

The elderly population stands out for its large population growth and for being frequently affected by chronic diseases, factors which, according to a study, present risk for inadequate HL, since they tend to have a greater need to use health services and a more complex therapy.¹⁴ This same study also reveals that patients with low economic conditions also present risk for inadequate HL. The population of this study was characterized by a large number of elderly people with low salaries, characteristics that can lead them to greater vulnerability to limited HL.

Regarding education, most patients completed elementary school. Some research has identified that fewer years of formal education are associated with worse HL, and getting a high school education was associated with better HL scores.¹⁵

Regarding health problems, it was observed that the most present were hypertension, heart problems, and diabetes. The appearance of such comorbidities with greater frequency confirms CKD in adults as secondary to hypertension and diabetes, a situation already well established in the world literature.¹⁶

In the evaluation of the five constructs that comprised the first part of the HQL, there was no significant difference

between non-adherent and medication-adherent individuals. However, medication adherents tended to agree more with four of the five constructs present, meaning that these individuals have a better HL on these constructs. The non-adherent individuals tended to agree more with only one of the constructs.

The second part of the questionnaire presents four constructs that, like the first part, do not present statistically significant difference, with the exception of two constructs that presented -p value lower than 0.05: "Ability to find good health information" and "Understands enough health information to know what to do", in which adherent individuals present higher indicators. In general, patients who adhere to medication had an easier time performing the actions described in all items of the constructs, which means they have better HL.

In the construct "Ability to find good health information", all patients presented difficulties in getting health information autonomously, regardless of medication adherence. However, 51 (75%) adherent individuals tended to have greater ease with the items in this construct, which may mean that they are people who use diversified sources to find health information and try to keep themselves updated. In turn, 63 (75%) non-adherent patients had scores lower than 3.79, not being able to access health information so easily, depending on other people to provide it. This construct was also cited as challenging in another study done with CKD patients.¹⁷

According to a study, the low HL is directly related to the lack of correct information and inadequate beliefs that users have about the diseases and treatments, generating consequences such as lack of knowledge about the care in the therapeutic regimen and the inability of self-care, which directly influences the non-adherence to medication.¹⁸

In the construct "Understands health information and knows what to do", adherents showed greater ease in all items (score higher than 3.67), indicating that they may be more able to understand different written information regarding health. More difficulty was observed on the part of non-adherent patients (score less than 3.11) indicating that they may have more difficulty understanding health information. Interestingly, these associations had statistical significance and a small effect size.

The HLQ demonstrated that the patients who tend toward adequate HL are the adherents. This means that the study population, being mostly non-adherent to treatment, tends to have borderline or inadequate HL. In summary, as is the case in most studies, HL showed a tendency toward a positive association with medication adherence, i.e., the higher the HL, the greater the medication adherence and vice versa.¹⁹ Among the studies presented in an integrative review, one found that inadequate HL tends to negatively influence

medication adherence, regardless of sociodemographic factors; another states that people with inadequate HL need individualized interventions to achieve good medication adherence; and another addresses low HL as an extremely relevant factor for leading to nonadherence and proposes interventions to improve medication adherence, all focusing on HL.²⁰

Although the study allowed an important approach to the topic of HL, it had limitations. The use of self-report to assess adherence can lead patients to non-real information in an attempt not to expose themselves to the professional; difficulty in comparing and discussing the research data, since we used an instrument that is still little used in Brazil; and the sample was small in relation to the population available at the place where the data was collected.

CONCLUSIONS

The study showed that, even though the scores presented low statistical significance, patients with medication adherence have a better HL, being more able to find good health information, understanding it clearly to know what to do. It also showed a large number of patients not adhering to medication, pointing to an inadequate HL. This fact explains the need for several strategies and interventions, both in professional practice and in research.

Among the practical strategies, we highlight the greater attention and sensitivity needed by the health professional to identify factors that put the patient at greater risk of presenting an inadequate HL, including socioeconomic and demographic factors; the use of effective educational strategies that contribute to a better understanding ability of patients and, consequently, improvement in medication adherence.

Among the strategies in the field of research, more studies with a larger sample using the HLQ as an instrument are needed in order to characterize the Brazilian population as to HL, identifying the sociodemographic, economic, and clinical risk factors, and thus invest in specific interventions that will contribute to better HL of the patients.

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Received in: 04/01/2021
Required revisions: Did not have
Approved in: 10/03/2021
Published in: 01/10/2021

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**Disclaimer: The authors claim to
have no conflict of interest.**