

The impact of health literacy in adherence to medications in a population with acute lumbar pain: a cross-sectional study

ANA LUÍSA AMORIM^{1, A-F}, PAULO SANTOS^{1, 2, A, C-G}

ORCID ID: 0000-0002-2362-5527

¹ Department of Community Medicine, Information and Health Decision Sciences, Faculty of Medicine, University of Porto, Porto, Portugal

² CINTESIS@RISE, MEDCIDS, Faculty of Medicine of the University of Porto, Porto, Portugal

A – Study Design, B – Data Collection, C – Statistical Analysis, D – Data Interpretation, E – Manuscript Preparation, F – Literature Search, G – Funds Collection

Summary Background. Acute lumbar pain is a common symptom. Generally, it has a good prognosis although presenting a great impact on quality of life, thus the importance of therapeutic guidance. Health literacy allows individuals to manage their own health and make the best choices, including the adherence to medication plans.

Objectives. We aim to evaluate the impact of health literacy in the adherence to medications in patients with acute lumbar pain.

Material and methods. We conducted a cross-sectional study based on an online self-report questionnaire from January 2022 to March 2022 to characterise the type of acute lumbar pain, adherence to medications, health literacy and other factors that could influence this, including comorbidities and socio-demographic information.

Results. A total of 249 participants with acute lumbar pain were included (68% females, mean age of 41 years). The utilisation of pain relief medication was indicated by 41% of the participants (50% by medical prescription), with good adherence in 84.4% (95% CI: 76.8–92.1%). Taking pain relief medication was not associated with literacy but with the impact of pain ($p = 0.020$).

Conclusions. Adherence to medications in patients with acute lumbar pain depends mostly on the perceived impact of the pain itself rather than on literacy for health. The ability to apply the available information in health care increases the adherence.

Key words: health literacy, medication adherence, low back pain, pain measurement.

Amorim AL, Santos P. The impact of health literacy in adherence to medications in a population with acute lumbar pain: a cross-sectional study. *Fam Med Prim Care Rev* 2023; 25(2): 128–132, doi: <https://doi.org/10.5114/fmpcr.2023.127669>.

Background

Lower back pain is a highly prevalent symptom in the population, which is related to a great variety of conditions [1] and carries a significant socio-economic burden and health-related costs [2]. In Portugal, it affects about 26.4% of the population [3]. Generally, it presents a good prognosis [1, 2], with most patients recovering in 6 to 8 weeks. After 12 weeks, pain is usually classified as chronic [4], representing 30-40% of patients [2, 5], with a worst prognosis leading to less mobility, lack of functionality and maladaptive psychosocial patterns [1]. Lower back pain patients are advised to maintain their normal life, taking pain-relief medications if needed [1, 5]. The principle is to use the lowest effective dose over a shorter time to reduce iatrogenic risk [1]. Nonsteroidal anti-inflammatory drugs (NSAIDs) and muscle relaxants are the most used drugs [5, 6]. Although adequate management of pain is a relevant factor in the prognosis, about half of the patients do not seek medical help [2].

The World Health Organization (WHO) defines health literacy as a set of social and cognitive competencies enabling people to access, understand and use health information leading to good health choices to promote health [7]. This is a broad concept that integrates four competencies (Access, Understand, Appraise and Apply) over three domains (health care, disease prevention and health promotion) [8]. Lower health literacy affects the comprehension of medical information, which has an impact on disease management and adherence to medications for chronic diseases [9, 10]. In acute diseases, including lower back pain, this relationship has still not been established [11]. Adherence to medications can be defined as the level of agreement between the healthcare provider's recommendations and

the patient's behaviour regarding the treatment regimen [12]. Poor adherence is multifactorial, integrating dimensions related to the patient, the condition, the medications, the providers and the health system organisation [13]. This is influenced by personal beliefs, fears and expectations, which should be taken in account during each appointment [11, 14]. Thoughts about taking control over their symptoms, not needing medication or potential side effects influence patients' behaviours and the way they deal with the medications [14], with the fear of potential harm being more relevant than the benefits or efficacy [15].

Objectives

The aim of this study was to evaluate the effect of health literacy in the adherence to medications in patients with acute lower back pain, taking into consideration other determinants of adherence.

Material and methods

We conducted a cross-sectional study involving patients with acute lower back pain. All patients 18 years of age or older were eligible for participation. Participants were invited through shared publications on several open social media platforms to answer our online questionnaire and to expand the invitation to their contacts using the snowball strategy. We used Facebook®, Instagram®, LinkedIn® and Twitter® through our own network utilising several groups of health-related issues. Although the definition of acute and chronic pain varies widely, we included all participants with back pain lasting less than 12 weeks, assum-



ing the most accepted classification [4]. The recruitment began in January 2022 until March 2022, when the estimated sample size was fulfilled. To answer the questionnaire, participants were asked to register themselves to assure they answered only once. Identification was not collected in the database, making the answers completely anonymous for research.

The first part of the self-reporting questionnaire consisted in the characterisation of the participants' last episode of pain, including its duration, when it occurred, the related circumstances (spontaneous onset or related with a precipitant event), the intensity of pain using an analogic visual 0–10 points scale, categorised as mild (0–4 points), moderate (5–6 points) or severe (7–10 points) [4], and the impact of the pain on work and daily activities. The subjects were grouped according to the duration of the episode by more or less than 6 weeks.

The second part of the questionnaire explored the utilisation of pain relief medication and the form, both prescription or self-medication. Those who received their medication from a medical prescription answered the "Measure of Adherence to Treatment" (MAT7) questionnaire [12] and the Portuguese adaptation of the "Beliefs About Medicine" questionnaire (BMQ) [15, 16].

The MAT7 is a 7-item instrument that evaluates the level of adherence to medication with high sensibility and specificity. The items are answered on a 6-points Likert scale, classified as 1-adherent (5–6 points) or 0-non-adherent (0 to 4), and a total score varying from 0 to 7, keeping the internal consistency of the instrument [12]. The median of the score defined the cut-off to split the subjects in higher (adherent) and lower (non-adherent). The answers were taken into consideration if the participants answered more than 80% of items [12].

The BMQ is a validated questionnaire to characterise the participant's beliefs about medication in a Necessity-Concerns model. It presents a 5 item "Necessity Scale" and a 6 item "Concerns Scale". The final scores were the sum of the answers on a Likert scale for each item. Higher scores predict higher beliefs in the represented concept. The categorisation used the scale's midpoint to group the subjects in high or low necessities/concerns, as described in literature [17]. Therefore, the cut-off of the "Necessities Scale" was 15, and the "Concerns Scale" was 18. We excluded participants with more than 5 items with missing answers [15]. The "Necessity-Concerns differential" is the difference between the necessities and the concerns total score, ranging from -25 to +25. A higher differential meant higher necessities and/or lower concerns and was associated with higher adherence [16–18]. We dichotomised the scale through positive beliefs (from 0 to 25) and negative beliefs (from -25 to -1).

We also asked about other therapies that might have been used, such as physiotherapy, osteopathy, Chinese traditional medicine, Pilates and stretching, local heat, as well as others that did not fit the other categories.

To evaluate the participants' level of literacy for health, we used the validated 12 questions of the Portuguese version of the European Health Literacy Survey (HLS-EU-PT) [19, 20]. The answers of the HLS-EU-PT were obtained on a 5 item Likert scale and were converted dichotomously to easy (1) or hard (0), allowing us to calculate the total literacy score, varying from 0 to 12 [21]. Participants were categorised as "Low Literacy", from 0 to 6, and "High Literacy", from 7 to 12 points.

We also checked for main comorbidities: mental health disorders (including anxiety, depression and other psychological issues), cardiovascular diseases (hypertension and previous cardiovascular events), diabetes mellitus, as well as all other chronic conditions that did not relate to the previous groups (respiratory, osteoarticular, neurological, digestive and other diseases). Lastly, socio-demographic information was reported: age, gender, body mass index, level of education, whether they worked in the health sector or had any academic education in health, as well as degree of satisfaction with income.

The sample size was estimated as a minimum of 246 subjects, assuming an error of 5% in a 95% confidence interval, with an expected prevalence of good adherence to medications of about 80% [22].

Data was analysed using Microsoft Excel 16.17® and SPSS 28.1®. We calculated proportions for categorical and mean plus standard deviation for continuous variables. Logistic regression was used for inferential analysis and calculation of the odds ratio. The participants with missing data were excluded from the analysis when the variable of interest did not have a valid value. We accepted an alpha error of 0.05.

This study received the approval of the Ethical Committee of the Hospital de São João/Faculty of Medicine of the University of Porto (process no. 390/2021). All the instruments developed by other authors were translated and validated in Portuguese and received the necessary authorisations to be used in the questionnaire applied to the participants. We provided an initial explanation of the study, ensuring anonymisation and respect for the autonomy of the participants. All participants gave their informed consent before answering.

Results

Descriptive analysis

A total of 249 participants were included in the study. Table 1 shows the socio-demographic characteristics of the population. The mean age was 41 years (± 12.4). Most of the participants were females (67.5%), had a superior education (74.5%), had education or work experience in health care (65.5%) and stated to be moderate to very satisfied with their income (63.1%). Mental health disorders were present in 17.7%, cardiovascular diseases in 11.2%, diabetes mellitus in 2.8% and other chronic diseases in 18.9%. A total of 102 participants (41%) reported the use of pain-relief medication, mostly non-steroidal anti-inflammatory drugs (NSAIDs – 85%), and 50.4% were prescribed by a healthcare provider. Physiotherapy was prescribed in 16.1% of the population, and 24.1% used alternative therapies.

Most of the participants had their last episode of pain in the previous month (52.2%), with 5.2% presenting at the time of research. Regarding the duration of the episode, 90.0% of participants presented with pain less than 6 weeks. A smaller proportion of 32.1% of individuals had a spontaneous onset of pain, while 63.1% identified some specific movement or position (4.8% were unable to specify). The evaluation of pain intensity was reported by 32.5% of the individuals as mild pain, 34.9% as moderate and 32.5% as severe pain. Lastly, 47.4% of patients reported a significant impact on daily life activities (44.6% moderate and 2.8% severe limitations).

A total of 21.8% of the participants believed that medication was necessary, and 19.5% had high levels of concern about medication. The differential between Necessities and Concerns showed positive beliefs in 33% of the participants.

High levels of health literacy were present in 71.5% of the participants.

Need for medication

A total of 102 patients (41.0%) took at least one pain relief medication. Moderate to severe pain intensity was associated with greater medication intake (80.4% vs 58.2%, $p < 0.001$), as was the higher impact of pain in daily activities (73.5% vs 29.3%, $p < 0.001$). Duration of pain less than 6 weeks was less associated with taking medication (38.8% vs 60.0%, $p = 0.041$).

From those who took some medication, 60.0% had a current prescription by a doctor with no difference between intensity of pain, impact or duration.

Adherence to medications

Good adherence to medications was reported by 84.4% of the participants that used medication (95% CI: 76.8–92.1%). Literacy for health did not impact adherence (OR = 1.006; 95% CI: 0.816–1.239; $p = 0.956$). Table 2 shows the relation between adherence to medications and variables with interest.

Characteristics		n = 249 (%)
Gender	male	81 (32.5)
	female	168 (67.5)
Mean age (SD)		41 (± 12.4)
Body Mass Index	≤ 18.9 kg/m ²	6 (2.4)
	< 25 and > 18.9 kg/m ²	140 (56.2)
	≥ 25 kg/m ²	103 (41.1)
Level of education	less than superior education	64 (25.7)
	superior education	185 (74.5)
Healthcare worker or formation	yes	163 (65.5)
	no	86 (34.5)
Satisfaction with level of income	moderate/very satisfied	157 (63.1)
	low satisfaction or unsatisfied	92 (36.9)
Comorbidities	mental health disease	44 (17.7)
	cardiovascular disease	28 (11.2)
	diabetes mellitus	7 (2.8)
	any chronic disease	47 (18.9)
Use of pain relief medication		102 (41.0)
	NSAIDs	79 (84.0)
	acetaminophen	20 (21.5)
	muscle relaxants	19 (20.2)
	opioids	3 (3.2)
	others	5 (5.3)
Use of pain relief medication by medical prescription		62 (50.4)
Use of pain relief medication by self-medication		32 (33.0)
Physiotherapy		40 (16.1)
Alternative therapies		60 (24.1)

	Adherence OR (CI 95%)	p*
Duration of last episode (less than 6 weeks)	2.364 (0.629–8.883)	0.203
Spontaneous beginning of pain	1.467 (0.419–5.138)	0.549
Pain intensity (moderate or severe)	0.678 (0.137–3.3578)	0.634
Impact of pain	2.250 (0.692–7.315)	0.178
Medical prescription	1.202 (0.357–4.046)	0.766
Medications (NSAIDs)	0.447 (0.053–3.796)	0.461
Medication (acetaminophen)	1.288 (0.241–6.248)	0.805
Physiotherapy	1.056 (0.264–4.224)	0.938
Any alternative medicines	0.776 (0.217–2.775)	0.696
More necessities (BMQ)	1.040 (0.901–1.201)	0.592
More concerns (BMQ)	0.978 (0.866–1.105)	0.721
Positive beliefs (Differential in BMQ)	0.346 (0.070–1.703)	0.192
Gender (male)	0.579 (0.180–1.857)	0.358
Age	0.984 (0.933–1.037)	0.540
Superior education level	3.750 (1.148–12.252)	0.029
Healthcare worker	0.519 (0.153–1.755)	0.291
Income satisfaction	1.089 (0.344–3.449)	0.885
Any chronic disease	0.600 (0.179–2.013)	0.408

* Logistic regression; NSAIDs – non-steroidal anti-inflammatory; BMQ – Beliefs About Medicine Questionnaire.

The proportion of adherent subjects according to the duration of pain was 63.6% in pain lasting less than a day, 86.7% in pain lasting from 1 day to 1 week, 91.7% in those with pain lasting 1 to 6 weeks, and 72.7% in subjects with pain from 6 to 8 weeks. According to the intensity of pain, 88.9% of those

with mild pain were adherent, 81.5% with moderate pain were adherent, and 83.0% of those with severe pain were adherent.

The European Health Literacy Scale allows one to analyse the different dimensions of literacy under a matrix of health care, disease prevention and health promotion, on the one

Table 3. Relation between different dimensions of health literacy and adherence to medications

	Access [OR (95% CI)]	Understand [OR (95% CI)]	Appraise [OR (95% CI)]	Apply [OR (95% CI)]
Health care	0.215 (0.026–1.754)	1.280 (0.386–4.241)	0.500 (0.153–1.631)	10.091 (1.512–67.331)
Disease prevention	0.651 (0.199–2.123)	1.944 (0.350–10.788)	0.686 (0.210–2.240)	0.617 (0.189–2.014)
Health promotion	2.688 (0.603–11.985)	2.083 (0.612–7.088)	1.417 (0.268–7.500)	1.771 (0.484–6.477)

hand, and the access, understanding, appraisal and application on the other hand. We checked the relation between adherence to medications and each dimension (Table 3). As expected, there was a significant relation between adherence and the patients' skills to apply the available information in health care, as seen in the question "on a scale from very difficult to very easy, how easy would you say it is to follow the instructions on medication?".

Discussion

Our study shows that the adherence to medications in patients with acute back pain depends mostly on the impact of the pain itself than on literacy concerning health. Nevertheless, when we look at the different dimensions of literacy, the ability to apply the available information in health care increases adherence.

Scientific evidence claims that higher levels of literacy improve adherence to medications [7, 9]. There are several studies proving this; however they are always using chronic diseases models [23–26]. As far as we know, this is the first study to characterise the relation between literacy and adherence to medications in acute back pain as a model of acute disease. Our study shows that literacy for health is not a determinant of adherence to pain relief medication in this acute model. Literacy is crucial to fulfil the autonomy of patients, making them more empowered to obtain, process and understand the information they need for their own health options [27]. Our population shows good literacy in more than two thirds of participants, above that expected for the general population [28–30], which makes us cautious about the extrapolation of our results. The explanation is mainly due to the age of our participants. Patients with acute back pain are commonly younger than the general population, thus justifying the difference. Even so, the main difference was the capacity to apply for health care, demonstrating that people that know the pathways around the health system are more adherent to medication, perhaps because they also have greater confidence in the system and a higher level of education, as supported by other authors [31, 32].

The same occurs with the relation between adherence and the effect of beliefs concerning medication. Although personal beliefs may influence the way patients adhere to medication [14], in this acute pain model, the confidence about medication seems to be established very soon after taking them in an all or nothing option: medications are good if the pain is relieved, or not if not. In this sense, the main factor associated to adherence to pain relief medication is the overall impact of the pain episode in everyday life, including the duration and intensity of pain as relevant factors. The same occurs when the medication is prescribed by the healthcare provider. The need for an appointment means that patients could not deal with symptoms in self-care and con-

sequently a greater perceived impact. These findings suggest that the perceived impact of acute lumbar pain is more relevant in taking medication than health literacy or personal beliefs.

Lower back pain can be a good model of the effect of literacy on adherence in acute diseases, where the immediate impact of the disease and its treatment overlaps the longitudinal management overtime [32, 33], different from chronic disease models more dependent on compliance both with the diagnosis and the treatment. However, the study findings should be applied to the general population with caution. The patients answering our questionnaire were younger than the general population, were healthier with few comorbidities and presented higher literacy. The snowball sampling we used may have contributed to these differences [34]. Being a non-probabilistic method of sampling, selection bias is expected, and the profile of the participants that agreed to be included in the study could have different characteristics than those who did not volunteer to participate. We must also point to the fact that many patients did not take any medication for their back pain, limiting the analysis of adherence and adding a possible memory bias due to the retrospective nature of the survey, although most of the episodes occurred in less than 1 month before participation. Nevertheless, we think these biases are not strong enough to invalidate our conclusions, although a larger study may strengthen them, which would also include characteristics we did not ask, like employment status or type of relationship with the doctor, which may interfere with the perceived impact and the utilisation of the healthcare facilities.

Conclusions

In patients with acute lumbar pain, the perceived impact of an episode in their everyday lives seems to be more relevant in adherence to medication than the level of health literacy. Unlike chronic diseases, where the effectiveness of medication is not as fast or as visible, and where it is necessary to educate the patient about the potential benefit of intervention, in this model of acute disease, adherence seems to depend more on the characteristics of the disease and patient, even if it improves in people who better know the pathways of the health facilities they use.

Acknowledgments. The authors would like to acknowledge Professor Maria Luisa Lima from ISCTE, Lisbon, for authorising the use of the "Measure Treatment Adherence", Professor Robert Horne from University College of London – School of Pharmacy, for authorising the use of the "Beliefs About Medicine Questionnaire", and Professor Luís Saboga-Nunes from the Nova University of Lisbon – National School of Public Health, for authorising the use of the "Portuguese version of the European Health Literacy Survey".

Source of funding: This work is financed by national funds through FCT Fundação para a Ciência e a Technology, I.P., within the scope of the project "RISE-LA/P/0053/2020".

Conflicts of interest: The authors declare no conflicts of interest.

References

1. Casser H-R, Seddigh S, Rauschmann M. Acute Lumbar Back Pain. *Deutsches Arzteblatt International* 2016; 113(13): 223–234, doi: 10.3238/arztebl.2016.0223.

2. Cruz EB, Canhão H, Fernandes R, et al. Prognostic indicators for poor outcomes in low back pain patients consulted in primary care. *PLoS ONE* 2020; 15(3): e0229265.
3. Branco JC, Rodrigues AM, Gouveia N, et al. Prevalence of rheumatic and musculoskeletal diseases and their impact on health-related quality of life, physical function and mental health in Portugal: results from EpiReumaPt – a national health survey. *RMD Open* 2016; 2(1): e000166, doi: 10.1136/rmdopen-2015-000166.
4. Oliveira CB, Maher CG, Pinto RZ, et al. Clinical practice guidelines for the management of non-specific low back pain in primary care: an updated overview. *Eur Spine J* 2018; 27(11): 2791–2803, doi: 10.1007/s00586-018-5673-2.
5. Cohen SP, Argoff CE, Carragee EJ. Management of low back pain. *BMJ* 2008; 337, doi: https://doi.org/10.1136/bmj.a2718.
6. Chou R, Huffman LH. Medications for acute and chronic low back pain: a review of the evidence for an American Pain Society/American College of Physicians clinical practice guideline. *Ann Intern Med* 2007; 147(7): 505–514, doi: 10.7326/0003-4819-147-7-200710020-00008.
7. Nutbeam D, Kickbusch I. Health promotion glossary. *Health Promot Int* 1998; 13(4): 349–364.
8. Sørensen K, Broucke S, van den, Fullam J, et al. Consortium Health Literacy Project E. Health literacy and public health: A systematic review and integration of definitions and models. *BMC Public Health* 2012; 12(1): 80, doi: 10.1186/1471-2458-12-80.
9. Andrus MR, Roth MT. Health literacy: a review. *Pharmacotherapy* 2002; 22(3): 282–302.
10. Pedro AR, Amaral O, Escoval A. Literacia em saúde, dos dados à ação: tradução, validação e aplicação do European Health Literacy Survey em Portugal. *Revista Portuguesa de Saúde Pública* 2016; 34(3): 259–275 (in Portuguese).
11. Edward J, Carreon LY, Williams MV, et al. The importance and impact of patients' health literacy on low back pain management: a systematic review of literature. *Spine J* 2018; 18(2): 370–376.
12. Delgado AB, Lima ML. Contributo para a validação concorrente de uma medida de adesão aos tratamentos. *Psicologia, Saúde e Doenças* 2001; 2(2): 81–100 (in Portuguese).
13. Osterberg L, Blaschke T. Adherence to medication. *N Engl J Med* 2005; 353(5): 487–497, doi: 10.1056/NEJMra050100.
14. Horne R, Chapman SC, Parham R, et al. Understanding patients' adherence-related beliefs about medicines prescribed for long-term conditions: a meta-analytic review of the Necessity-Concerns Framework. *PLoS ONE* 2013; 8(12): e80633, doi: 10.1371/journal.pone.0080633.
15. Horne R, Weinman J, Hankins M. The beliefs about medicines questionnaire: the development and evaluation of a new method for assessing the cognitive representation of medication. *Psychology and Health* 1999; 14(1): 1–24.
16. Salgado T, Marques A, Geraldes L, et al. Cross-cultural adaptation of the Beliefs about Medicines Questionnaire into Portuguese. *Sao Paulo Medical Journal* 2013; 131: 88–94.
17. Steenis M, van, Drienaar J, Bensing J, et al. Relationship between medication beliefs, self-reported and refill adherence, and symptoms in patients with asthma using inhaled corticosteroids. *Patient Prefer Adherence* 2014; 8: 83–91, doi: 10.2147/PPA.S44185.
18. Menckeberg TT, Bouvy ML, Bracke M, et al. Beliefs about medicines predict refill adherence to inhaled corticosteroids. *J Psychosom Res* 2008; 64(1): 47–54, doi: 10.1016/j.jpsychores.2007.07.016.
19. Saboga-Nunes L, Sørensen K, Pelikan J, et al. Cross-cultural adaptation and validation to Portuguese of the European Health Literacy Survey (HLS-EU-PT). *Atencion Primaria* 2014; 46(1): 12–13.
20. Finbråten HS, Wilde-Larsson B, Nordström G, et al. Establishing the HLS-Q12 short version of the European Health Literacy Survey Questionnaire: latent trait analyses applying Rasch modelling and confirmatory factor analysis. *BMC Health Serv Res* 2018; 18(1): 506, doi: 10.1186/s12913-018-3275-7.
21. Storms H, Claes N, Aertgeerts B, et al. Measuring health literacy among low literate people: an exploratory feasibility study with the HLS-EU questionnaire. *BMC Public Health* 2017; 17(1): 475, doi: 10.1186/s12889-017-4391-8.
22. Alexandre NMC, Nordin M, Hiebert R, et al. Predictors of compliance with short-term treatment among patients with back pain. *Revista Panamericana de Salud Pública* 2002; 12: 86–95.
23. Huang Y-M, Shiyabola OO, Chan H-Y. A path model linking health literacy, medication self-efficacy, medication adherence, and glycaemic control. *Patient Educ Couns* 2018; 101(11): 1906–1913, doi: 10.1016/j.pec.2018.06.010.
24. Huang Y-M, Shiyabola OO, Chan H-Y, et al. Patient factors associated with diabetes medication adherence at different health literacy levels: a cross-sectional study at a family medicine clinic. *Postgrad Med* 2020; 132(4): 328–336, doi: 10.1080/00325481.2020.1749499.
25. Lor M, Koleck TA, Bakken S, et al. Association Between Health Literacy and Medication Adherence Among Hispanics with Hypertension. *J Racial Ethn Health Disparities* 2019; 6(3): 517–524, doi: 10.1007/s40615-018-00550-z.
26. Suhail M, Saeed H, Saleem Z, et al. Association of health literacy and medication adherence with health-related quality of life (HRQoL) in patients with ischemic heart disease. *Health Qual Life Outcomes* 2021; 19(1): 118, doi: 10.1186/s12955-021-01761-5.
27. Ratzan S, Parker R. *Introduction*. In: Selden CR, Zorn M, Ratzan S, et al., eds. *National Library of Medicine current bibliographies in medicine: Health literacy*. Bethesda: National Institutes of Health; 2000: v–vii.
28. Santos P, Sá L, Couto L, et al. Sources of information in health education: a cross-sectional study in Portuguese university students. *AMJ* 2018; 11(6): 352–360, doi: 10.21767/AMJ.2018.3435.
29. Espanha R, Ávila P. Health Literacy Survey Portugal: A Contribution for the Knowledge on Health and Communications. *Procedia Computer Science* 2016; 100: 1033–1041, doi: 10.1016/j.procs.2016.09.277.
30. Arriaga M, Francisco R, Nogueira P, et al. Health Literacy in Portugal: Results of the Health Literacy Population Survey Project 2019–2021. *Int J Environ Res Public Health* 2022; 19(7): 4225, doi: 10.3390/ijerph19074225.
31. Wolf MS, Davis TC, Osborn CY, et al. Literacy, self-efficacy, and HIV medication adherence. *Patient Educ Couns* 2007; 65(2): 253–260, doi: 10.1016/j.pec.2006.08.006.
32. Jimmy B, Jose J. Patient medication adherence: measures in daily practice. *Oman Med J* 2011; 26(3): 155–159, doi: 10.5001/omj.2011.38.
33. Pritchard MT, Butow PN, Stevens MM, et al. Understanding Medication Adherence in Pediatric Acute Lymphoblastic Leukemia 2006; 28(12): 816–823, doi: 10.1097/01.mph.0000243666.79303.45.
34. Dusek G, Yurova Y, Ruppel CP. Using social media and targeted snowball sampling to survey a hard-to-reach population: a case study. *International Journal of Doctoral Studies* 2015; 10: 279.

Tables: 3
 Figures: 0
 References: 34

Received: 03.10.2022
 Reviewed: 09.02.2023
 Accepted: 24.02.2023

Address for correspondence:
 Paulo Santos, MD, PhD
 Alameda Hernani Monteiro
 S/N 4200-319 Porto
 Portugal
 Tel.: +351 220426600
 E-mail: psantosdr@med.up.pt