

## RESEARCH ARTICLE (ORIGINAL) 8

## Social Determinants of Health Literacy Among Patients Admitted to Surgical Oncology Departments: A Descriptive-Correlational Study

*Determinantes Sociais de Literacia em Saúde em Pessoas Internadas em Serviço Cirúrgico Oncológico: Estudo Descritivo-Correlacional*  
*Determinantes Sociales de la Alfabetización en Salud en Personas Ingresadas en un Servicio de Cirugía Oncológica: Estudio Descriptivo-Correlacional*

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### Abstract

**Background:** Health literacy (HL) refers to an individual's ability to access, understand, and use information to make the best choices for maintaining and improving their health.

**Objective:** To characterize the HL levels of patients admitted to a surgical oncology department and examine the association between HL levels and social characteristics.

**Methodology:** This observational, cross-sectional, descriptive-correlational study included a sample of 188 patients admitted to a surgical oncology department between May and September 2020. Data were collected using a form for social characterization and HL assessment.

**Results:** On average, participants had a problematic HL level. HL levels were influenced by factors such as age, gender, educational attainment, and self-perceived economic status.

**Conclusion:** This study contributes to a better understanding of the determinants influencing HL and highlights the need for further research in this area to inform health policies and decision-making.

**Keywords:** health literacy; oncology service, hospital; social determinants of health; observational study

### Resumo

**Enquadramento:** A literacia em saúde (LS) refere-se à capacidade da pessoa aceder, compreender e utilizar informação para assumir as melhores opções com vista a manter e melhorar a saúde.

**Objetivo:** Caracterizar o nível de LS da pessoa internada num serviço cirúrgico de oncologia e identificar a relação entre as características sociais e o nível de LS.

**Metodologia:** Estudo observacional transversal, descritivo-correlacional. Amostra constituída por 188 pessoas internadas num serviço de cirurgia oncológica, no período de maio a setembro de 2020. A recolha de dados foi realizada através de formulário de caracterização social e de avaliação da LS.

**Resultados:** Em média, os participantes apresentam um nível problemático de LS. Características como a idade, o sexo, o nível de escolaridade, e a auto perceção da situação económica demonstraram ter influência no nível de LS.

**Conclusão:** O presente estudo contribui para uma melhor compreensão dos determinantes que influenciam a LS e salienta a necessidade de mais investigação nesta área, de forma a informar as políticas de saúde e a tomada de decisão.

**Palavras-chave:** literacia em saúde; serviço hospitalar de oncologia; determinantes sociais da saúde; estudo observacional

### Resumen

**Marco contextual:** La alfabetización en salud se refiere a la capacidad de una persona para acceder, comprender y utilizar la información con el fin de tomar las mejores decisiones para mantener y mejorar la salud.

**Objetivo:** Caracterizar el nivel de AS de las personas ingresadas en un servicio de cirugía oncológica e identificar la relación entre las características sociales y el nivel de AS.

**Metodología:** Estudio observacional descriptivo-correlacional transversal. La muestra estuvo formada por 188 personas ingresadas en un servicio de cirugía oncológica entre mayo y septiembre de 2020. Los datos se recogieron mediante un formulario de caracterización social y evaluación de AS.

**Resultados:** De media, los participantes tienen un nivel problemático de AS. Se ha demostrado que características como la edad, el sexo, el nivel educativo y la situación económica autopercibida influyen en el nivel de AS.

**Conclusión:** Este estudio contribuye a una mejor comprensión de los determinantes que influyen en la AS y subraya la necesidad de seguir investigando en este ámbito para fundamentar las políticas sanitarias y la toma de decisiones.

**Palabras clave:** alfabetización en salud; servicio hospitalario de oncología; determinantes sociales de la salud; estudio observacional



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## Introduction

Health literacy (HL) has gained prominence on political agendas (Cruz et al., 2023) as a strategy to reduce the impact of the social gradient on health and increase equity in the pursuit of global health (Ferreira et al., 2024; Smith, 2021). Improving HL contributes to better health outcomes and a reduction in inequalities (Smith, 2021). As a key social determinant of health, HL has the potential to improve individual healthcare experiences (Ferreira et al., 2024; Smith, 2021). Reducing HL gaps is essential to achieving the targets outlined by Healthy People 2030 (Bindhu et al., 2024). Governments and health organizations must recognize the importance of assessing the HL levels of their populations, as these serve as 'beacons' for guiding the development of more effective public policies and tailored interventions in healthcare, health promotion, and disease prevention (Cruz et al., 2023).

Adequate HL goes beyond the ability to read and understand health information; it focuses mainly on an individual's ability to take responsibility for their own health (Smith, 2021) and that of others. Low HL levels seem to be associated with poorer health status and impaired quality of life (Smith, 2021), as well as poorer health outcomes such as low compliance and adherence to therapeutic regimens, poor ability to self-manage, inadequate self-care, increased risk of hospitalization and mortality, and higher healthcare costs (Smith, 2021).

As a chronic disease, cancer is a global public health problem where early detection and healthy lifestyle choices are essential. Screening plays a critical role in facilitating early diagnosis, which can significantly improve prognosis. However, adherence to screening programs depends on an individual's HL level. According to Minh et al. (2022), having a good understanding of cancer patients' HL, particularly in the early stages of the disease, can support the implementation of strategies to improve disease management and overall health outcomes. On the other hand, as diagnostic and treatment options for cancer improve, patients are increasingly required to navigate complex healthcare systems and manage treatment regimens at home (Hyatt et al., 2021), which are only possible with a good HL level. HL is essential for ensuring that healthcare systems can provide adequate cancer care (Hyatt et al., 2021) in collaboration with the patients. Assessing HL levels is the first step in designing health interventions (Ferreira et al., 2024).

This study aimed to characterize the HL levels of patients admitted to a surgical oncology department and examine the association between HL levels and social characteristics.

## Background

The definition of HL has evolved over time based on the various dimensions of competences developed by the 'individual'—a term that, in this article, refers to both individuals and collectives, such as organizations. These

competences support more conscious, responsible, and appropriate decision-making, ultimately leading to better health outcomes (Cruz et al., 2023; Liu et al., 2020). HL is a dynamic and complex concept (Smith, 2021) that refers to an individual's ability to access, understand, appraise, and apply health information (Sørensen et al., 2015). HL refers to an individual's knowledge and competences (in individual and system contexts) to meet the complex demands of health in modern society (Liu et al., 2020; Sørensen et al., 2015). The construct of HL encompasses three major elements: (1) knowledge of health, healthcare, and health systems; (2) processing and using information in various formats in relation to health and healthcare; and (3) ability to maintain health through self-management and working in partnerships with health providers (Liu et al., 2020). The multivariable nature of HL (Bindhu et al., 2024) makes it difficult to assess among the population (Urstad et al., 2022) due to its complexity. Consequently, future research should address the inconsistencies in definitions and measurement tools currently used in many HL studies (Urstad et al., 2022). Despite the importance of HL, Ryman et al. (2024), in a systematic review, found that adults with cancer had limited HL levels (Holden et al., 2021). People living with cancer face many challenges and should have a clear understanding of their diagnosis and treatment options to make informed decisions about their care. Coughlin et al. (2022) also reported that a significant percentage of cancer survivors have low HL, which may hinder their ability to self-manage their disease and navigate the healthcare system to achieve optimal care. Given the widespread prevalence of low HL levels, health service providers, healthcare systems, and policymakers have, in recent decades, prioritized increasing patient access to health information (Bindhu et al., 2024, Ferreira et al., 2024) and reinforcing the importance of the interactions between individuals, healthcare providers, and healthcare systems (Liu et al., 2020; Nutbeam & Lloyd, 2021). There is now a consensus that patients should have timely and convenient access to their electronic health records, including clinic notes. However, clinic notes and other health information can contain jargon that is difficult for patients to understand, reducing the utility of health information sharing (Bindhu et al., 2024), particularly in oncology. To address this, it is essential to improve the quality of health communication by enhancing frontline professional skills and support and ensuring that priority is proportional to need, reaching and engaging population groups with low HL (Nutbeam & Lloyd, 2021). Indeed, interventions designed to improve and address HL can enhance patients' ability to understand the information contained in their clinic notes (Bindhu et al., 2024; Ferreira et al., 2024).

Health disparities and inequities, overall health outcomes, understanding health information, and the ability to be fully informed about health decisions can have long-term consequences on the health of populations (Flores et al., 2023), particularly among populations with cancer (Ryman et al., 2024). Evidence of a social gradient in HL has been found in population surveys, with socially

disadvantaged populations having poorer health and lower HL levels compared to more advantaged populations (Nutbeam & Lloyd, 2021; Ryman et al., 2024; Schillinger, 2021; Svendsen et al., 2020). García-García and Pérez-Rivas (2022) concluded that people over 65 years of age, those with incomplete secondary education, and those who were unemployed scored lower on several dimensions of HL. In fact, low HL is directly related to higher hospitalization rates, poorer adherence to medication regimens, worse preventive behaviors, worse general health status, increased mortality, higher economic costs, and greater health inequalities (Baccolini et al., 2021). On the other hand, sociodemographic factors and their association with HL can increase adherence to treatment and health interventions (Schillinger, 2021) in oncology and quality of life, reduce physical and emotional distress and suffering (Holden et al., 2021; Ryman et al., 2024), and improve patient experiences (Holden et al., 2021; Samoil et al., 2021), due to an enhanced ability to understand and process information.

## Research question

Is there an association between the age of cancer patients and their HL levels?

What differences in HL levels can be observed based on gender, educational attainment, and self-perceived economic status?

## Methodology

An observational, quantitative, cross-sectional, descriptive-correlational study was conducted. Data were collected through consecutive sampling from a population of 211 individuals admitted to a surgical oncology department in Portugal between May and September 2020. Twenty-three individuals were excluded from the study due to difficulties in understanding the questions. The final sample consisted of 188 participants aged 18 or older who were able to understand the questions. The mean age was 61.28 years ( $\pm 16.06$ ), with the majority aged over 65 (46.3%). Slightly more than half were women (52.7%;  $n = 99$ ). Most participants had completed basic education ( $n = 86$ ), followed by secondary education ( $n = 63$ ) and higher education ( $n = 28$ ). Additionally, seven participants were illiterate, and four were able to read and write. The majority of participants classified their economic status as fair (82.0%,  $n = 154$ ), while 9% ( $n = 17$ ) considered it bad, and another 9% ( $n = 17$ ) considered it good. Data were collected using a form for sociodemographic characterization (gender, age, educational attainment, and economic status) and HL assessment. The form

was administered by the researchers who received prior training on the questioning criteria to minimize bias. HL was assessed using the Portuguese version of the European Health Literacy Survey (HLS-EU-PT), which was validated and adapted for the Portuguese population (Pedro et al., 2016) and used with the authors' permission. The instrument showed good reliability, with Cronbach's alpha coefficients ranging from 0.90 to 0.96. The assessment instrument includes 47 questions rated on a 4-point scale: 1 - "Very Easy", 2 - "Easy", 3 - "Difficult", and 4 - "Very Difficult". The HLS-EU-PT assesses HL across three domains: 16 questions on health care, 15 questions on disease prevention, and 16 questions on health promotion. Information processing comprises four stages: access, understand, appraise, and apply. The combination of the three domains with the processing stages results in a matrix of 12 sub-indices. HL is then classified into four levels on a standardized scale from 0 to 50: inadequate HL (0-25), problematic HL (>25-33), sufficient HL (>33-42), and excellent HL (>42-50). Ethical principles were upheld, and the study received approval from the hospital's Ethics Committee (Opinion no. 07/2020). Data were processed using IBM SPSS Statistics software, version 24.0. Missing data were handled by imputing the mean for quantitative variables and the mode for qualitative variables. The result of the Kolmogorov-Smirnov test led to the use of non-parametric statistical tests ( $Sig. = 0.000$ ). Inferential analyses included the Mann-Whitney  $U$  test and the Kruskal-Wallis test to analyze group differences, while Spearman's correlation coefficient was used to assess correlations. A significance value of  $p < 0.05$  was adopted for all statistical tests.

## Results

The mean HL score among participants was 31.41 ( $\pm 4.48$ ), indicating a problematic HL level (Table 1). The majority of participants (61.1%) had a problematic HL level, and approximately one-third had a sufficient HL level. The domain with the lowest HL scores was disease prevention, while the domain of health promotion had the highest HL scores. In terms of information processing stages, participants had higher HL levels in the 'understand' stage. Conversely, 23.4% of participants had inadequate HL levels in the 'access' stage, which had the worst HL level.

On average, women had higher HL levels across all the domains and information processing stages. Statistically significant differences were found in the 'access' and 'appraise' stages, as well as in the disease prevention and health promotion domains ( $p$ -values ranging from 0.025 to 0.028; Table 1, Figures 1 and 2).

**Table 1**

*HL levels, HL domains and information processing stages, by gender*

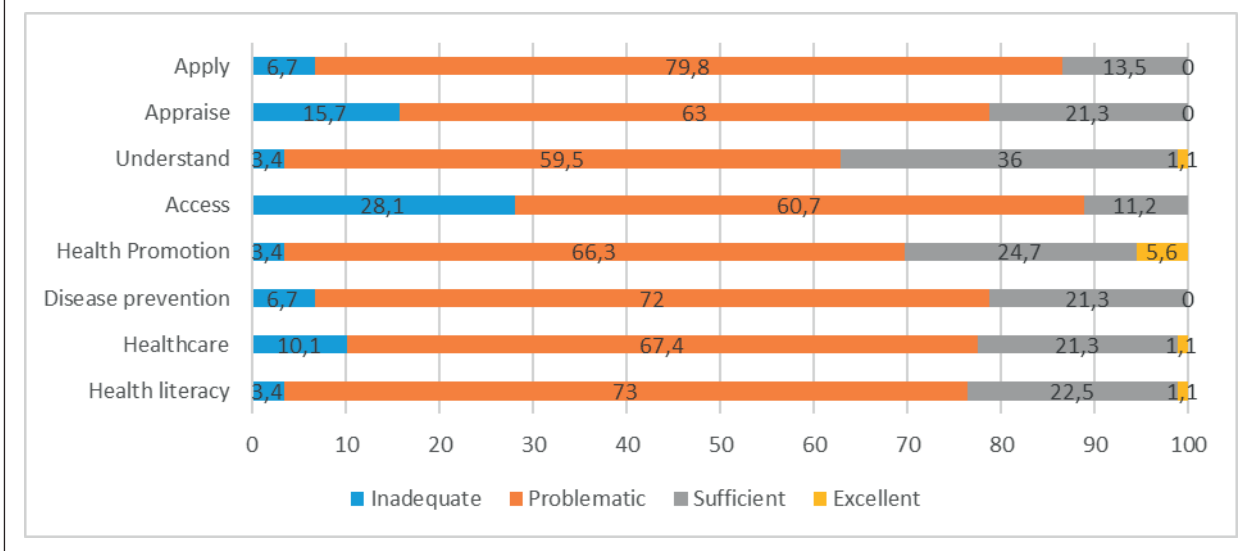
	Total						Male (n = 89)		Female (n = 99)		Mann-Whitney U test		
	Mean	Standard deviation	Inadequate HL (%)	Problematic HL (%)	Sufficient HL (%)	Excellent HL (%)	Mean	Standard deviation	Mean	Standard deviation	Z	p	
<b>Health literacy</b>	31.41	4.48	6.4	61.1	30.9	1.6	30.82	3.57	31.95	5.13	-1.902	0.057	
<b>Domains</b>	Healthcare	30.78	4.96	10.6	59.0	29.3	1.1	30.51	4.09	31.03	5.65	-0.876	0.381
	Disease prevention	30.72	4.60	8.0	63.3	28.2	0.5	30.02	3.52	31.35	5.33	-2.198	<b>0.028</b>
	Health promotion	32.79	5.01	4.3	55.8	33.0	6.9	31.95	4.45	33.54	5.37	-2.240	<b>0.025</b>
<b>Information processing stages</b>	Access	29.15	5.12	23.4	57.0	19.1	0.5	28.35	3.96	29.87	5.89	-2.238	<b>0.025</b>
	Understand	33.18	4.84	5.3	51.6	40.4	2.7	32.82	3.99	33.49	5.49	-0.105	0.294
	Appraise	30.77	4.89	12.7	58.0	27.7	1.6	29.99	4.37	31.47	5.23	-2.216	<b>0.027</b>
	Apply	30.07	4.36	8.5	69.7	21.8	0.0	29.71	3.86	30.39	4.76	-1.400	0.161

Note. % = Percentage; Z = Mann-Whitney U test; p = Level of significance.

Figure 1 and Figure 2 show the distribution of HL levels (%) among male and female participants, respectively, revealing higher HL levels among female participants.

**Figure 1**

*Information processing stages, HL domains and HL levels (%), male gender*



**Figure 2**

*Information processing stages, HL domains, and HL levels (%), female gender*

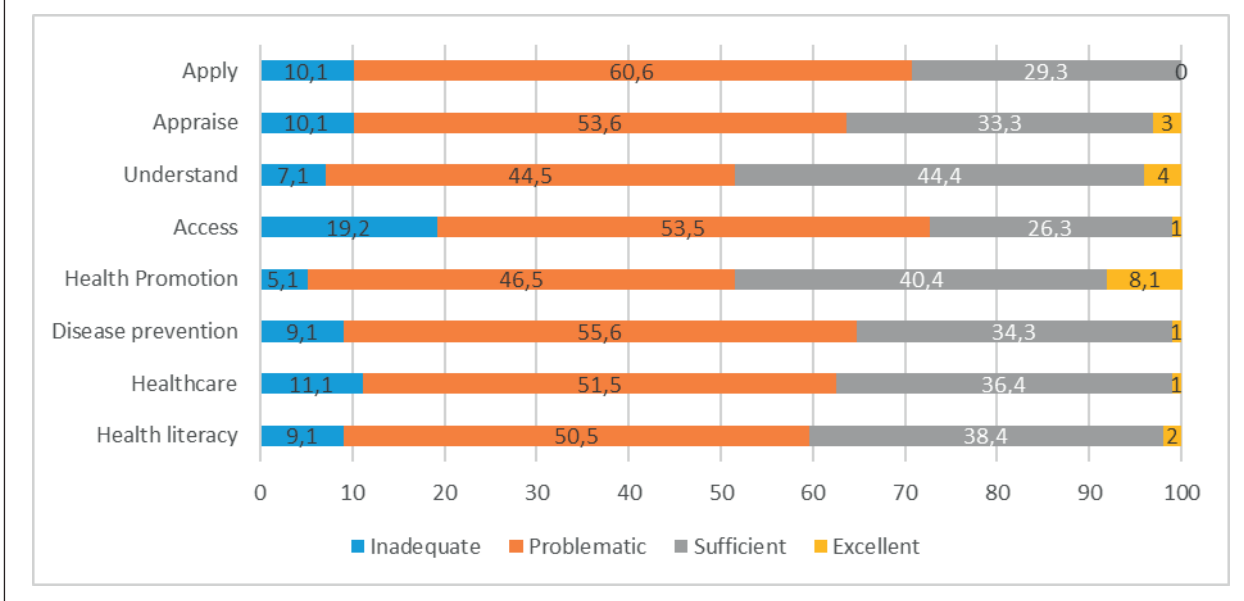


Table 2 shows a highly significant statistical association ( $p < 0.01$ ) between HL levels and age, with older par-

ticipants exhibiting lower HL levels across all domains and information processing stages.

**Table 2**

*HL levels, HL domains and information processing stages, by age*

	Age		18-30 years (n = 7)		31-50 years (n = 40)		51-64 years (n = 54)		65 years or older (n = 87)		Spearman's correlation		
	M	SD	M	SD	M	SD	M	SD	M	SD	Test value	p	
<b>Health literacy</b>	31.41	4.48	34.95	2.32	32.28	3.45	32.23	4.48	30.22	4.73	-0.306	< 0.001	
<b>Domains</b>	Healthcare	30.78	4.96	34.57	2.59	31.30	3.63	31.79	4.88	29.62	5.40	-0.243	< 0.001
	Disease prevention	30.72	4.60	35.71	2.02	32.29	4.04	31.22	4.49	29.29	4.52	-0.373	< 0.001
	Health promotion	32.79	5.01	34.59	3.16	33.32	3.76	33.72	4.99	31.81	5.49	-0.237	0.001
<b>Information processing levels</b>	Access	29.15	5.12	33.10	2.24	30.79	3.99	30.35	4.93	27.34	5.25	-0.410	< 0.001
	Understand	33.18	4.84	37.14	3.67	33.75	3.58	34.06	5.12	32.05	4.98	-0.235	0.001
	Appraise	30.77	4.89	33.77	2.13	31.36	4.27	31.41	5.15	29.85	5.00	-0.245	< 0.001
	Apply	30.07	4.36	32.99	2.61	30.55	4.40	30.55	4.15	29.34	4.86	-0.210	0.004

Note. n = Sample; M = Mean; SD = Standard deviation; p = Level of significance.

Participants' educational attainment showed a highly significant statistical correlation with overall HL level ( $p = 0.002$ ), the HL domains, and the information processing

stages ( $p < 0.001$ ), with the exception of the 'apply' stage (Table 3). Thus, participants with higher educational attainment had higher HL levels.

**Table 3***HL levels, HL domains and information processing stages, by educational attainment*

		Mean rank				Kruskal-Wallis		
		Illiterate ( <i>n</i> = 7)	Able to read and write ( <i>n</i> = 4)	Basic education ( <i>n</i> = 86)	Secondary education ( <i>n</i> = 63)	Higher education ( <i>n</i> = 28)	Test value	<i>p</i>
<b>Health literacy</b>		51.86	70.00	86.58	101.42	117.43	17.429	<b>0.002</b>
<b>Domains</b>	Healthcare	38.57	76.00	84.77	104.22	119.14	23.910	< <b>0.001</b>
	Disease prevention	55.86	58.25	84.52	102.90	121.07	22.634	< <b>0.001</b>
	Health promotion	44.86	61.00	88.05	100.33	118.39	18.580	< <b>0.001</b>
<b>Information processing stages</b>	Access	22.50	41.38	80.07	108.97	13.186	49.969	< <b>0.001</b>
	Understand	51.36	59.00	85.67	98.52	128.41	24.589	< <b>0.001</b>
	Appraise	41.00	62.38	88.76	100.37	116.88	18.654	< <b>0.001</b>
	Apply	82.00	82.00	94.60	92.55	103.50	2.190	0.700

Note. *n* = Sample; *p* = Level of significance.

Table 4 shows that the overall HL level ( $p = 0.046$ ), the health care domain ( $p = 0.011$ ), the health promotion domain ( $p = 0.041$ ), and the 'access' ( $p = 0.015$ ) and 'understand' stages ( $p = 0.038$ ) had statistically significant

correlations with the self-perceived economic situation. Participants who perceived their socioeconomic status as fair or good had higher HL levels.

**Table 4***HL levels, HL domains and information processing stages, by self-perceived economic status*

Self-perceived economic status	Bad		Fair ( <i>n</i> = 154)		Good ( <i>n</i> = 17)		Mean rank			Kruskal-Wallis		
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	Bad ( <i>n</i> = 17)	Fair ( <i>n</i> = 154)	Good ( <i>n</i> = 17)	Test value	<i>p</i>	
<b>Health literacy</b>	28.60	3.23	31.79	4.35	30.83	5.79	67.62	97.06	98.16	6.160	<b>0.046</b>	
<b>Domains</b>	Healthcare	27.49	4.52	31.16	4.72	30.71	6.44	61.62	97.25	102.47	9.071	<b>0.011</b>
	Disease prevention	28.24	3.06	31.13	4.72	29.50	6.69	73.29	97.94	84.53	5.209	0.074
	Health promotion	30.17	2.90	33.13	5.12	32.31	4.98	67.50	98.12	88.74	6.405	<b>0.041</b>
<b>Information processing stages</b>	Access	25.83	3.25	29.58	4.99	28.58	6.57	62.24	97.31	101.26	8.358	<b>0.015</b>
	Understand	30.24	4.04	33.49	3.64	33.24	6.46	66.03	96.94	100.88	6.523	<b>0.038</b>
	Appraise	28.24	3.92	31.15	4.84	29.89	5.54	68.09	96.76	100.41	5.720	0.057
	Apply	27.91	4.40	30.40	4.19	29.25	5.36	79.15	96.30	93.59	2.345	0.310

Note. *M* = Mean; *SD* = Standard deviation; *p* = Level of significance.

## Discussion

In this study, the mean HL level of the sample is problematic, which is consistent with the results reported by Lopes et al. (2024), Mingote et al. (2024), and Pedro et al. (2016). In a European study, Baccolini et al. (2021) found that one in every three to almost one in every two adult Europeans may not be able to understand essential health-related material. Lopes et al. (2024), in a study involving individuals attending primary care nursing consultations in Portugal, found the following HL levels: 32% inadequate, 56% problematic, and 12% sufficient. Similarly, a study conducted by Ferrão et al. (2021) with adult participants found that 23.7% had an inadequate HL level, while 64.5% had a problematic level. Hyatt et

al. (2021) supported these findings using the Brief Health Literacy Screening Tool (BRIEF). However, in another study carried out in mainland Portugal with a sample of 1,247 participants, the authors concluded that seven out of 10 participants had a high HL level, as measured by the HLS<sub>19</sub>-Q12 instrument (Arriaga et al., 2022).

In this study, female participants had higher mean HL levels. This finding is supported by studies conducted by Coughlin et al. (2022), Lopes et al. (2024), and Svendsen et al. (2020). However, Arriaga et al. (2022) found higher HL levels among male participants. Other studies have reported no differences in HL between male and female participants (Barros et al., 2022; Mingote et al., 2024; Minh et al., 2022).

This study found a negative correlation between HL levels

and age, a finding similar to Arriaga et al. (2022), Ferrão et al. (2021), García-García and Pérez-Rivas (2022), and Minh et al. (2022). However, these results were not confirmed in the studies by Barros et al. (2022), Flores et al. (2023), and Mingote et al. (2024), which reported no statistically significant differences between HL and age. Svendsen et al. (2020), in a study conducted among a relatively well-educated population in Denmark, found that younger individuals had lower HL levels.

This study revealed that participants with higher educational attainment (secondary and higher education) had higher HL levels. This finding is largely supported by Arriaga et al. (2022), Barros et al. (2022), Ferrão et al. (2021), García-García and Pérez-Rivas (2022), Mingote et al. (2024), Minh et al. (2022), Ryman et al. (2024), Schillinger (2021), and Svendsen et al. (2020).

The participants in this study reported a fair self-perceived economic status, and a positive statistical correlation was found between this perception and HL. These findings are supported by Schillinger (2021). In a study of the Portuguese population, Arriaga et al. (2022) found that most participants rated their socioeconomic status as fair. Although this study focused on self-perception rather than professional status, this construct is closely related to professional situation and income level. The literature suggests that retired and unemployed individuals have lower HL levels, and that HL tends to increase in line with income levels (Coughlin et al., 2022; García-García and Pérez-Rivas, 2022; Pedro et al., 2016; Svendsen et al., 2020). However, a literature review by Flores et al. (2023) found no statistical correlation between poverty and HL in the studies analyzed.

One limitation of this study is that its findings cannot be generalized, as the data were collected from a small sample, in a single location, and over a limited period of time.

## Conclusion

This study revealed that a considerable proportion of people admitted to a surgical oncology department had insufficient HL levels, highlighting areas where people were more vulnerable. These findings suggest potential difficulties in self-managing cancer and navigating the healthcare system to achieve optimal care and outcomes. This study also contributes to a better understanding of the determinants that influence HL. Female gender, younger age, higher educational attainment, and a favorable self-perception of the economic status are positively associated with HL levels. This information can be used by healthcare providers and other stakeholders to promote adequate HL levels, reduce health inequalities, encourage the responsible use of health resources, and empower individuals using healthcare services.

This study highlights the need for further research to better understand the influence of social variables on HL, with the aim of informing health policies and supporting decision-making by healthcare providers and managers. It also emphasizes the importance of prioritizing the empowerment of the most vulnerable groups in HL. Future

research should also explore the health gains associated with improved HL. Increasing HL will yield a positive return on investment by enhancing individual health and quality of life, increasing healthcare professional satisfaction, and reducing healthcare costs shared across the community.

## Author contributions

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