

DISSERTATION FOR THE DEGREE OF DOCTOR OF PHILOSOPHY (PhD)

Assessing Communicative Health Literacy with Physicians in
Healthcare Services

by Frederico Epalanga Albano Israel

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DOCTORAL SCHOOL OF HEALTH SCIENCES
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Supervisor: Dr. Éva Bíró



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LIST OF ABBREVIATIONS

β : Linear Regression Coefficient

95%CI: 95% Confidence Interval

AAHLS: All Aspects of Health Literacy Scale

C&C HL: Communicative & Critical Health Literacy

C.E.S.M.: Comité de Ética do Ministério da Saúde/Ministry of Health's Ethics Committee

CATI: Computer-Assisted Telephone Interviews

COM-HL: Communicative Health Literacy

COSMIN: COnsensus-based Standards for the selection of health status Measurement
INstruments

COVID-19: Coronavirus disease 2019

EU: European Union

FCCHL: Functional, Critical & Communicative Health Literacy

FHL: Functional Health Literacy

HbA1c: Haemoglobin A1c

HCPs: Health Care Providers

HIV: Human Immunodeficiency Virus

HL: Health Literacy

HLS19: European Health Literacy Population Survey 2019-2021

HLS19-COM-P-Q6: Short Version of the Communicative Health Literacy Questionnaire of the
HLS19 Survey

IBM: International Business Machines

KMO: Kaiser-Meyer-Olkin

M: Mean

M-POHL: World Health Organization Action Network on Measuring Population and Organizational Health Literacy

NCDs: Non-Communicable Diseases

NY: New York

OR: Odds Ratio

OSSS-3: three-item Oslo Social Support Scale

p: p-value

PAPI: Pen-and-Paper Personal Interviews

PCA: Principal Component Analysis

QoL: Quality of Life

ref.: reference

SD: Standard Deviation

SPSS: Statistical Package for the Social Sciences

USA: United States of America

WHO: World Health Organization

1. INTRODUCTION

Health literacy (HL) has emerged as a crucial determinant of individual and population health [1, 2] and an important indicator of the effectiveness of health promotion and public health initiatives [2]. It is defined as “the cognitive and social skills which determine the motivation and the ability of individuals to gain access to, understand and use information in ways which promote and maintain good health” [3, p. 357]. Sørensen and colleagues [4, p. 3] defined it as “linked to literacy and entails people’s knowledge, motivation and competences to access, understand, appraise, and apply health information in order to make judgements and take decisions in everyday life concerning healthcare, disease prevention and health promotion to maintain or improve quality of life during the life course”. According to the World Health Organization (WHO), health literacy is essential for empowering individuals to make informed decisions regarding their personal health, as well as for facilitating their active participation in collective efforts to promote health and address the underlying determinants of health [5]. Other benefits include enabling citizens to be actively involved in maintaining and improving their health, participating effectively in community health initiatives, and advocating for government accountability in health and equity issues [5].

1.1 Conceptualising health literacy and its main domains

The concept of HL has become a focus of public health. The term appeared first in the 1970s and was introduced in the article “Health Education as Social Policy” by Simonds in 1974 [6], where it was framed as a key element of health education and public policy. However, dedicated scientific research on HL expanded primarily from the 1980s and onward [7], while the term “communicative HL” was introduced in the transition of the 1990s/2000s through Nutbeam’s model of HL [7, p.29]. Thus, Nutbeam [2] introduced a three-tier model for HL aligned with the three types of general literacy: functional HL, interactive HL, and critical HL. According to the model, functional HL encompasses the fundamental writing and reading skills required to access, understand health information, and utilise services effectively [2]. Interactive HL refers to an advanced skill that enables people to extract health information and derive meaning from various sources and apply it effectively in evolving situations [2]. Critical HL refers to an advanced skill that allows individuals to evaluate health information and use it to gain greater control over their health and life circumstances [2].

In addition, expanding from Nutbeam framework, communicative HL (COM-HL) is defined as people's "communicative and social skills that enable them to actively engage in face-to-face encounters with healthcare professionals, to give and seek information, derive meaning from it, and apply this information in decision making in co-producing their health care" [8, p. 23]. Adults aged 18 years and older frequently interact with healthcare professionals and navigate healthcare services but may still face challenges in understanding and communicating health information due to low COM-HL skills. Thus, it is essential to develop an appropriate instrument to effectively measure COM-HL in adults. Therefore, recently, the WHO Action Network on Measuring Population and Organisational Health Literacy created the HLS19-COM-P instrument under the umbrella of the European Health Literacy Population Survey 2019-2021 (HLS19), which allows researchers to assess all aspects of COM-HL in the adult population [8]. For instance, many individuals struggle to maintain their health due to the lack of COM-HL skills that hinder them from finding and understanding health information, accessing healthcare, as well as their low socioeconomic status, cultural attainment, and belonging to vulnerable groups [9, 10, 11,12].

Communicative health literacy is an area that requires attention from policymakers and researchers, as it constitutes a crucial aspect of public health, particularly in low- and middle-income countries with diverse linguistic, cultural, and socio-economic landscapes [11, 12]. One of the key indicators of health care quality is physician-patient communication, which improves health outcomes [13]. Despite its importance, no similar study has yet been conducted in either Angola or Hungary.

2. LITERATURE REVIEW

2.1 The underinvestigated situation and relevance of communicative health literacy

There are many studies on HL. However, the majority of them focus mainly on functional HL, and only a limited number evaluate COM-HL [7, 14]. This research gap appears to be global. Evidence suggests that communication-related aspects of HL, such as COM-HL, remain underinvestigated in empirical studies, and communicative and interactional components are only weakly integrated into existing research [15]. Furthermore, according to the literature, few studies exist that explore COM-HL in African countries, and none of them have been carried out to provide an overall assessment of COM-HL in the general population. Only Ghana and Ethiopia have each published

a single study focusing on COM-HL, but both studies were limited in scope to patients with food-borne and non-communicable diseases [16, 17].

2.2 The questionnaires to measure communicative health literacy

According to the literature, before the HLS19-COM-P, two instruments, the Functional, Critical & Communicative Health Literacy (FCCHL) and the All Aspects of Health Literacy Scale (AAHLS) were available [18, 19], but none of them focused solely on COM-HL. The FCCHL instrument was used in other countries, such as Sweden and Germany, as well [20, 21]. It consists of 5 items: the first three emphasize the ability to gather, extract, and comprehend health-related information, while the last two concentrate on evaluating the credibility of this information and applying health knowledge in daily life [18]. The AAHLS instrument was developed to measure functional, communicative and critical HL in primary care settings [19].

The review of existing instruments shows that only a few questionnaires have been developed to assess COM-HL, highlighting a gap in available measurement tools. The HLS19-COM-P appears to be the only instrument available that covers aspects of COM-HL broadly and without mixing other types of HL, making it an appropriate tool for its assessment [22]. The instrument has been developed in Europe and validated in some European countries [22], indicating the need for further validation in additional and more diverse geographical contexts over time.

2.3 International comparison of communicative health literacy

Notably, COM-HL tends to be among the most challenging domains of HL. For example, a Japanese study among diabetic patients found that people had more difficulties with COM-HL items than with functional HL (FHL) [18]. In the same survey, on average, participants scored 3.4/4 for FHL, whereas for COM-HL it was only 2.6/4 [18]. In Poland, where the FCCHL tool was used, the average score on the COM-HL scale was 2.8/4 among Polish adults aged 65 years and above [23]. Also, a study conducted across nine European countries found the level of COM-HL to range between 62.5 and 76.6 out of 100 [24]. The first validated USA-based study assessing functional, communicative, and critical HL in adults using the AAHL questionnaire found that 60.9% of American adults scored as having inadequate COM-HL [25]. Another study examining HL and self-efficacy among university students in the USA, which also used the AAHL instrument, found that on average, students score 2.5 for COM-HL [26]. In the case of Africa, a study conducted in Ethiopia, whose participants were living with non-communicable diseases

(NCDs), reported that they had a high level of COM-HL in four of the six assessed domains, such as social support for health, healthcare provider support, active engagement with healthcare providers, and navigation of the healthcare system [17]. On the other hand, some individuals with NCDs demonstrated low levels of COM-HL in the areas of proactive health management and in the ability to access and identify reliable health information [17].

2.4 Communicative health literacy — its determinants and outcomes

Both positive and negative determinants of COM-HL have been identified. Factors positively influencing individuals' COM-HL include high social status, good financial status, young age, being trained in healthcare, and an increased number of general practitioner visits [24]. Additionally, an Ethiopian study found that education status, living in an urban area, having more sources of information, and good monthly income were associated with better COM-HL [17]. The same study concluded that female participants were 50% less likely than male participants to have a high level of COM-HL in the domain of active health management [17].

Regarding factors negatively influencing COM-HL, the European study [24] shows that financial deprivation, being a female, an increased number of specialist visits, and having chronic conditions were among them. In connection with the area of living, a markedly lower level of COM-HL was observed among respondents residing in towns (rural) with a population of fewer than twenty thousand residents [23].

Regarding the outcomes of COM-HL, it was found to influence the quality of life (QoL) among individuals with diabetes [27]. A Malawian study emphasises individuals' COM-HL as essential for engaging effectively with healthcare providers, enhancing skills to assess information from diverse sources related to sexual, reproductive health, and HIV [28]. Lai and colleagues [29] found that COM-HL skills were significantly associated with self-management behaviours in patients with end-stage renal disease and diabetes. In another study, it was found that both patient's COM-HL and perceived participation in patient-physician communication were associated with enhanced self-efficacy and reduced HbA1c levels [30]. According to a Japanese study, COM-HL demonstrated a positive association with both the understanding of diabetes care and higher self-efficacy [31]. Findings indicate that higher levels of COM-HL among Japanese adults were significantly associated with increased physical and recreational activities, including the

importance of taking vacations [32], which are essential for maintaining good mental health, especially in adulthood.

The results of a Japanese study on patients from urban and rural areas with heart failure, show that individuals with limited COM-HL had poorer knowledge and adherence to self-care behaviours compared to those with higher COM-HL [33]. A study among patients with hypertension found that family support facilitated by COM-HL significantly improved primary stroke prevention behaviours [34]. Also, an Iranian study of patients with type 2 diabetes showed that COM-HL was significantly associated with adherence to dietary guidelines, regular physical activity, blood glucose monitoring, and appropriate foot care practices [35].

With respect to health-related attitudes among individuals with high COM-HL skills, studies have consistently found a positive effect on how people handle their health issues and navigate healthcare services [34, 35]. However, one study found that COM-HL was more strongly correlated with vaccination adherence compared to functional and critical health literacy [36]. Paradoxically, parents with higher levels of COM-HL were less likely to fully adhere to the recommended vaccines [36], an attitude that seems to be surprising. According to the literature, having high COM-HL and being literate in general were associated with having more sources of health information and seeking opinions from health care providers, friends, and family members, which supports more rational health decision [10, 37]. A study in Sydney highlights the positive effect of COM-HL and educational attainment on empowering individuals' ability to make a more rational health decision [38]. The findings of the study highlight that individuals with higher COM-HL and education levels were better able to select a trustworthy source of information and choose reliable healthcare practitioners [38].

2.5 Challenges of communicative health literacy

Regarding individuals' COM-HL issues worldwide, it appears that many people experience challenges with COM-HL. For example, in Tibet, a study conducted among patients with tuberculosis found that only 37.3% of them had good COM-HL skills, and only 30.3% scored well on information acquisition ability [39]. A Dutch study of functional and communicative health literacy among chronic disease patients revealed that 20.0% of the subjects experienced difficulties in disease self-management due to low COM-HL [40]. According to Mirczak's survey, one in five Polish adults aged 65 years and above reported never seeking information from multiple sources,

and more than one-quarter of the surveyed indicated that they have never verified the accuracy of the information obtained regarding their medical condition [23].

In Africa, communicative challenges in health care settings were observed in a few existing studies, such as Ghana, Zimbabwe, South Africa, and Senegal [16, 41, 42, 43]. In Ghana, it was reported that 20.0% of the study respondents indicated that sometimes, and 56.0% often, have the ability to provide all relevant information concerning their condition when consulting with physicians or nurses about foodborne illnesses [16]. A study conducted in two hospitals in Zimbabwe revealed that 40.4% of respondents reported that they frequently seek clarification, 53.9% reported doing so occasionally, while 5.8% stated that they do not seek clarification when engaging with healthcare professionals [41].

When it comes to judging the given information, the same study found that approximately 14.9% of participants reported consistently engaging in thoughtful consideration of health information provided by healthcare professionals, whereas 40.9% indicated doing so occasionally, and 44.2% reported rarely engaging in such reflective evaluation [41]. In South Africa [42], two questions about COM-HL were included in an HL study, whose results found poor interactions, less trust, and communicative issues between healthcare providers and healthcare users. The survey found that fewer than a quarter (23.8%) of respondents reported having ever sought information from health care providers (HCPs), and slightly more than half of the participants (52.4%) preferred to obtain health information from clinics rather than relying on neighbours and friends [42]. The capacity of women to navigate healthcare services and make informed decisions appears to be poorer in low-income countries. In contrast to the example from Sydney [38], evidence from some low- and middle-income countries, such as Senegal, suggests that men and mother-in-laws often play a decisive role in women's health decisions during pregnancy, highlighting how COM-HL extends beyond the individual woman to include family and social power dynamics that shape health-related communication [43].

2.6 Objectives

The research is significant for three reasons. Firstly, the study covers COM-HL, and this is a subject on which there is a notable lack of research in general. Furthermore, there have been no studies that measures COM-HL in Hungary or Angola – a gap in our knowledge that this study seeks to fill.

Secondly, the findings of this research are expected to provide new and valuable insights into COM-HL in relation to patient-physician interactions in healthcare services. Practically, the findings may benefit researchers, healthcare professionals, health educators, and policymakers who aim to improve patient experience and strengthen patient-centred care. In turn, the study can contribute to the development of policies that could improve health outcomes, patient satisfaction, and healthcare overall.

Thirdly, the study provides a strong foundation for future research by validating the Hungarian and Portuguese versions of the HLS19-COM-P instrument. Research using the same tool can be carried out by other parties, confident that they are using an accurate and reliable questionnaire.

Therefore, the purpose of this study was to investigate COM-HL in health care services, centered on patient-physician interaction. The specific aims of the study were:

- I. to validate the short Hungarian version of the HLS19-COM-P COM-HL instrument,
- II. to validate the short Portuguese version of the HLS19-COM-P COM-HL instrument,
- III. to assess COM-HL of the Hungarian and the Angolan population aged 18 years and above,
- IV. to describe the determinants of COM-HL in both Hungarian and Angolan adults,
- V. to investigate the association between COM-HL and various health-related outcomes in Hungarian adults.

3. METHODOLOGY

3.1. Survey 1 – Hungarian survey

3.1.1 Study design and sampling

The survey was conducted as a component of the HLS19 study [8]. Following a pilot study (n=30) with a primary focus on the comprehensibility of the questions, the data collection occurred in 2020 using a probability-based sample comprising 1205 individuals, selected through a multistage proportionally-stratified sampling design representative of the Hungarian adults [44]. In the initial allocation step, regions were chosen as the primary strata, followed by settlement type as the secondary strata. Afterwards, localities within these strata were selected using probability-proportional-to-size sampling, after which the required number of respondents from each settlement type within each region was determined. In the final stage of sampling construction, a two-level stratified design was applied: the first level consisted of region and settlement type, while

the second level incorporated the age group, sex, education level, and settlement type of the respondent. This procedure produced a probability sample representative of the Hungarian population aged 18 years and older living in private households by age, sex, education, and type of settlement.

Due to the COVID-19 pandemic-related restrictions, the data collection process was via computer-assisted telephone interviews (CATI). Approval for the study was obtained from the Medical Research Council and Research Committee, Hungary (IV/10181-3/2020/EKU). Informed consent was secured from all participants in accordance with the ethical standards set forth in the Declaration of Helsinki.

3.1.2 Data collection domains and tools

3.1.2.1 Sociodemographic data

Information on respondents' age was collected (grouped later as 18 – 25, 26 – 35, 36 – 45, 46 – 55, 56 – 65, 66 – 75, and 76+), as well as sex (male/female), number of children, education level (maximum primary school, vocational school, high school, college or university degree), and whether they were trained in a health profession (yes/no). Participants rated their level of social status on a 1 – 10 scale, where 1 indicates the lowest and 10 the highest level in society. The respondent had to select the number that represented the step at which they would place themselves, and scores below 5 were considered as of low social status [8]. Based on the HLS19 methodology, respondents' financial deprivation was assessed through the questions on the difficulty of (1) affording needed medication, (2) medical examinations or treatments, (3) and paying all bills. The answers were recorded on a 4-point Likert-scale ranging from very difficult to very easy. The composite measure of financial deprivation, where score above 50 indicates deprivation [8], was calculated as follows:

$$DEPR_i = \left(\frac{n_i(3) + n_i(4)}{N_{valid,i}} \right) \times 100$$

where

$DEPR_i$ is the deprivation score for individual i

$n_i(3)$ is the number of items with response value “3 – difficult” for individual i

$n_i(4)$ is the number of items with response value “4 – very difficult” for individual i

$N_{\text{valid},i}$ is the number of valid responses (values 1 – very easy to 4 – very difficult) across the three items for individual i .

3.1.2.2 Health status and social support

Self-perceived health was assessed on a five-point Likert-scale ranging from 1 (very bad) to 5 (very good), having a chronic health problem (yes/no) and being limited by health problems (yes/no) were also measured, using the questions of the European Health Interview Survey 2019 [45, 46]. Assessment of perceived social support was conducted using the three-item Oslo Social Support Scale (OSSS-3), with total scores stratified into pre-defined categories: 1) poor support (scores less than 8), 2) moderate support (scores between 9 and 11), and 3) strong support (scores greater than 12) [45, 46].

3.1.2.3 Health behaviour

Health behaviour was assessed with four questions [45, 46] about the number of days in an average week when the respondent 1) smoked any tobacco products, 2) drank alcohol, 3) ate fruits or vegetables and 4) was physically active. All these variables were dichotomized into favourable and unfavourable health behaviour. Favourable behaviours were defined as being a non-smoker, non-drinker, carry out daily physical activity and consumption of fruits and vegetables every day.

3.1.2.4 Communicative health literacy

To evaluate the level of COM-HL, the Hungarian version of the HLS19-COM-P tool was used. The original English version [8, 22] of the instrument was developed by the HLS19 Consortium COM-HL working group. The short version of the tool (HLS19-COM-P-Q6) was used, consisting of six items measuring COM-HL as follows: how easy 1) “to explain your health concerns to your doctor?”, 2) “to get enough time in the consultation with your doctor?”, 3) “to express your personal views and preferences to your doctor?”, 4) “to ask your doctor questions in the consultation?”, 5) “to be involved in decisions about your health in dialogue with your doctor?”, 6) “to recall the information you get from your doctor?”. A four-point Likert-scale from “very easy” to “very difficult” was used to answer the questions. In accordance with the international guidelines [8, 22], the final COM-HL score is calculated as follows:

$$\text{COM-HL}_i = \left(\frac{n_i(3) + n_i(4)}{N_{\text{valid},i}} \right) \times 100$$

where

COM – HL_{*i*} is the COM-HL score for individual *i*

$n_i(3)$ is the number of items with response value “3 – easy” for individual *i*

$n_i(4)$: number of items with response value “4 – very easy” for individual *i*

$N_{\text{valid},i}$ is the number of valid responses (values 1–4) across the items for individual *i*.

If the proportion of items with invalid responses exceeded 20%, the score was set to “missing”. A higher score means a higher level of COM-HL.

3.1.3 Statistical analyses

Initially, descriptive analysis was conducted to describe the sociodemographic characteristics and COM-HL of the respondents using statistically weighted frequencies or means, along with their 95% confidence intervals (95%CI). This procedure ensured that estimates reflected the general adult population in Hungary with respect to sex, age, education level, and settlement type.

The study used the terminology from the COnsensus-based Standards for the selection of health status Measurement INstruments (COSMIN) taxonomy when described the measurement properties of the questionnaire [47]. Reliability was evaluated through analyses of internal consistency and alternative test-retest methods. Cronbach’s alpha and “alpha if item deleted” (which examines changes in the overall alpha coefficient after the removal of a single component) were used to measure internal consistency, and the value between 0.70 and 0.95 was considered to give an acceptable reliability [48]. Given that repeated data collection for a traditional test-retest analysis was not feasible due to the constraints imposed by the COVID-19 pandemic, an alternative measure of reliability was calculated using the Spearman-Brown split-half reliability method. In this process, the items were randomly allocated into two groups, and the total score on each half of the instrument was calculated. Following the correlation of the two score sets, the corrected Spearman-Brown correlation coefficients were computed. The consistency was interpreted as medium if correlation coefficients ranged from 0.50 to 0.69, strong for values between 0.70 to 0.80, and very strong when the Spearman-Brown coefficient exceeded 0.90. The Item-Total correlations were also examined, with values exceeding 0.30 regarded as acceptable. As part of a sensitivity analysis, the internal consistency of the COM-HL scale was additionally evaluated within sociodemographic subgroups.

To assess the construct validity of the questionnaire, the principal component analysis (PCA) was employed. The factor structure of the questionnaire was determined through PCA of valid responses. The factorability of the data was assessed through the Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy and the Bartlett-test. The strength of correlation between the items of the questionnaire was examined through Spearman's correlation, where higher values denote stronger inter-item correlations.

The association between COM-HL, analysed as a continuous variable, and sociodemographic, social support, and health status variables was investigated by multiple linear regression analyses adjusted for social status, number of children, and presence of health professional training. Regression coefficients (β) and their respective 95%CI were used to quantify the associations.

Multivariate logistic regression models were used to examine whether COM-HL affects the health status and behaviour, while controlling for the confounding effect of sex, age, social status, education, financial deprivation, childrearing, training in a health profession, and social support. Associations were quantified by odds ratios (OR) and corresponding 95%CI.

The data analysis was carried out by the Stata/IC 16 statistical software's survey data analysis module and by the SPSS 26.0 software (IBM Corporation, Armonk, New York, USA).

3.2 Survey 2 – Angolan survey¹

3.2.1 Study design and sampling

The cross-sectional study was conducted in seven Angolan provinces from three main regions (North, South and East), in November and December 2023. The regions and municipalities were selected to reflect the general Angolan population in terms of community diversity, including rural/urban areas, ethnic minorities, developed/less developed areas, and high/low income and social capital. Participants were aged 18 years and above. Inclusion criteria included being aged 18 years or over, being an Angolan national, living permanently in Angola, whether from rural or urban areas, being able to speak the language of the questionnaire and having no mental disabilities or other incapacities that would prevent them from participating in the interview. Recruitment sites, data collection time points and participants were randomly selected. Post-stratification

¹ At the time of submission, the manuscript based on the Angolan dataset had not yet been published. Following minor revisions, the manuscript was resubmitted to BMJ Open and it is currently awaiting editorial decision.

weights were applied to ensure that estimates reflect the general adult Angolan population by sex, age, level of education, and area of residence.

Data were collected through pen-and-paper personal interviews (PAPI). Ethical approval for the study was granted by the Angolan Ministry of Health's Ethics Committee (C.E.S.M) under reference number 024/C.E.S.M/2023. In accordance with the principles outlined in the Declaration of Helsinki, informed consent was obtained from all participants prior to their participation in the interviews.

3.2.2 Data collection domains and tools

3.2.2.1 Sociodemographic data

Data were collected on the participants' age (categorised later as 18-29, 30-49, 50-69, and 70+), sex (male/female), education level (no formal education, primary education, lower secondary education, upper secondary education, and higher education), training in a health profession (yes/no), employment status (employed, self-employed, unemployed, retired, student/trainee, and domestic tasks), and area of residence categorised as urban or rural. Data on financial deprivation, social status and self-perceived health were also collected from the participants. These parameters were handled exactly in the same way as in Survey 1 (see details in 3.1.2).

3.2.2.2 Communicative health literacy measures

The Portuguese version of the COM-HL instrument was developed from the original English version of the HLS19-COM-P-Q6 [8]. The Portuguese version was generated through two independent translation processes involving two bilinguals from Portugal and Angola; one is an experienced Portuguese–English–English–Portuguese translator, interpreter, and instructor, and director of the Camões Institute of Budapest for Portuguese Language, and the other is an Angolan translator and interpreter. Besides that, more professional entities were involved in the process. The two translated versions were compared and consolidated; however, prior to finalisation, each underwent independent review by two assessors. Following meticulous examination and refinement, the versions were harmonised to produce the final Portuguese questionnaire. The instrument was further subjected to evaluation through a focus group discussion (n = 8) and a pilot study (n = 32) prior to its official administration in the survey. To assess COM-HL levels, Survey 2 followed the same methodology as described in Survey 1 (see details in 3.1.2).

3.2.3 Statistical Analyses

The process followed the same pattern as in Survey 1 (see details in 3.1.3). Initially, the sociodemographic characteristics and COM-HL of the participants were reported using statistically weighted frequencies and mean scores, accompanied by their respective 95% CI.

The internal consistency of the COM-HL scale was assessed using Cronbach's Alpha, Spearman-Brown Coefficient, and "alpha if item deleted". The questionnaire's factor structure was determined through a PCA of the valid responses.

Linear regression analyses were performed to measure the relationship between COM-HL and age, sex, area of residence, education level, employment status, training in a health profession, financial deprivation, self-perceived health, and self-perceived social status. The results were expressed as regression coefficients (β) with 95% CI.

The data was entered using Kobo Toolbox Software version 2023.2.4. and statistical analyses were conducted using IBM SPSS Statistics (versions 25.0 and 29.0; IBM Corporation, Armonk, NY, USA). If post-stratification weights could not be computed because of missing data on age, sex, level of education, or area of residence, cases were excluded through listwise deletion.

4. RESULTS

4.1 Survey 1 - Hungarian survey

4.1.1 Characteristics of the sample

The study sample totalled 1205 participants, of which females comprised the majority with 53.2%. The average age of the participants was 48.0 years (ranging from 18-91 years, with a standard deviation, SD: 17.5), whereas approximately one-third of the respondents were aged 35 years or younger. Participants with lower and upper secondary education levels comprised approximately 67%. Nearly 78% of the participants were not trained in a health profession, and 69.8% of the total sample reported having children. The percentage of people who were not financially deprived was 65.1%. Most of the respondents, i.e., 72.4%, perceived their social status as normal. Regarding self-perceived health status, 55.1% assessed their health as good or very good, and approximately 30% reported possessing strong social support. The weighted distribution of the studied parameters is shown in Table 1.

Table 1 Sociodemographic parameters, self-perceived health and social support of the Hungarian sample

		Weighted proportion (%)* (95% CI)
Sex	Male	46.8% (43.9-49.6%)
	Female	53.2% (50.4-56.1%)
Age groups	18-25 years	10.9% (9.3-12.9%)
	26-35 years	19.0 (16.9-21.4%)
	36-45 years	16.3% (14.3-18.5%)
	46-55 years	18.6% (16.5-20.9%)
	56-65 years	15.4% (13.4-17.5%)
	66-75 years	12.9% (11.1-14.9%)
	76 + years	6.8% (5.5-8.4%)
Level of education	Highest primary education	17.6% (15.5-19.8%)
	Lower secondary education	33.3% (30.7-36.1%)
	Upper secondary education	33.3% (30.7-36.1%)
	Tertiary education	15.8% (13.8-17.9%)
Training in a health profession	Yes	22.2% (19.9-24.7%)
	No	77.8% (75.3-80.1%)
Financial deprivation	Deprived	34.9% (32.1-37.7%)
	Non-deprived	65.1% (62.3-67.9%)
Childrearing	Yes	69.8% (67.2-72.4%)
	No	30.2% (27.6-32.8%)
Self-perceived health	Bad or very bad	8.2% (6.8-9.9%)
	Fair (i.e., neither good nor bad)	36.8% (34.0-39.5%)
	Good or very good	55.1% (52.3-57.9%)
Perceived social status	Low (score below 5)	27.6% (25.1-30.2%)
	Normal (score above 4)	72.4% (69.8-74.9%)
Social support	Poor	17.4% (15.3-19.7%)
	Moderate	52.9% (49.9-55.7%)
	Strong	29.8% (27.6-32.5%)

*: weighted by age, sex, education and settlement type, 95% CI: 95% confidence interval

4.1.2 Measurement properties of the questionnaire

4.1.2.1 Reliability tests

In the total sample, internal consistency, as measured by Cronbach's alpha coefficient, was 0.87, while split-half reliability as calculated using the Spearman-Brown correlation coefficient, yielded a value of 0.87. The reliability estimates for the respective subsamples are provided in Table 2. Cronbach's alpha value ranged from 0.84 in individuals with low perceived social status to 0.89 among individuals aged 76+ years and those trained in health professions. Meanwhile, the Spearman-Brown correlation coefficient ranged from 0.83 in individuals aged 26-35 years to 0.90 in individuals with health profession training and aged 18-25 years. Additional details are illustrated in Table 2.

Table 2 Cronbach's alpha values and Spearman-Brown correlation coefficients for the total Hungarian sample and the subsamples

		Cronbach's alpha	Spearman-Brown coefficient
Total sample		0.87	0.87
Sex	Males	0.88	0.88
	Females	0.86	0.86
Age groups	18-25 years	0.86	0.90
	26-35 years	0.87	0.83
	36-45 years	0.88	0.87
	46-55 years	0.87	0.86
	56-65 years	0.86	0.88
	66-75 years	0.86	0.88
	76 + years	0.89	0.88
Level of education	Highest primary education	0.85	0.86
	Lower secondary education	0.87	0.88
	Upper secondary education	0.88	0.84
	Tertiary education	0.87	0.87
Trained in a health profession	Yes	0.89	0.90
	No	0.86	0.85
Financial deprivation	Deprived	0.85	0.86
	Non-deprived	0.87	0.86
Childrearing	Yes	0.87	0.86
	No	0.88	0.89
Perceived social status	Low (score below 5)	0.84	0.84
	Normal (score above 4)	0.88	0.87

The Cronbach's alpha coefficient was tested by removing single items. The result showed that the elimination of any item resulted in a decrease in the overall alpha coefficient, except for the last item. Notably, the removal of the last item led to a modest increase in the coefficient from 0.87 to 0.88 (see Table 3). The values of the total-item correlation coefficient exceeded the commonly accepted threshold of 0.30 (see Table 3). The lowest correlation was observed in the last item with a value of 0.65, whereas the highest was for the third item with 0.85.

Table 3 Analysis of the correlation between the individual items and the whole Hungarian communicative health literacy scale

Items of the scale	Cronbach's alpha after deleting this item	Item-total correlation coefficient
Item 1: Explain your health concern to your doctor	0.85	0.78
Item 2: Get enough time in the consultation with your doctor	0.86	0.78
Item 3: Express your personal views and preferences to your doctor	0.83	0.85
Item 4: Ask your doctor questions in the consultation	0.84	0.83
Item 5: Be involved in decisions about your health in dialogue with your doctor	0.84	0.81
Item 6: Recall the information you get from your doctor	0.88	0.65

4.1.2.2 Explanatory factor analyses

Below (in Table 4), the result of the principal component analysis indicates that all the items loaded into one factor, as evidenced by a significant Bartlett's test ($p < 0.001$) and a high Kaiser-Meyer-Olkin (KMO) value of 0.891. This single factor explains a total of 62.2% of the variance.

Table 4 Result of the principal component analysis of the Hungarian communicative health literacy scale

Items of the scale	Factors	Uniqueness
Item 1: Explain your health concern to your doctor	0.79	0.38
Item 2: Get enough time in the consultation with your doctor	0.77	0.40
Item 3: Express your personal views and preferences to your doctor	0.85	0.27
Item 4: Ask your doctor questions in the consultation	0.84	0.29
Item 5: Be involved in decisions about your health in dialogue with your doctor	0.82	0.32
Item 6: Recall the information you get from your doctor	0.63	0.60
Variance	3.73	
Variance proportion (%)	62.2	

The inter-item Spearman's bivariate correlation coefficients ranged between 0.35 to 0.68. The last item, "*to recall the information you get from your doctor*", had the lowest Spearman's bivariate correlation coefficient (see Table 5).

Table 5 Spearman's bivariate correlations between the items of the Hungarian communicative health literacy scale

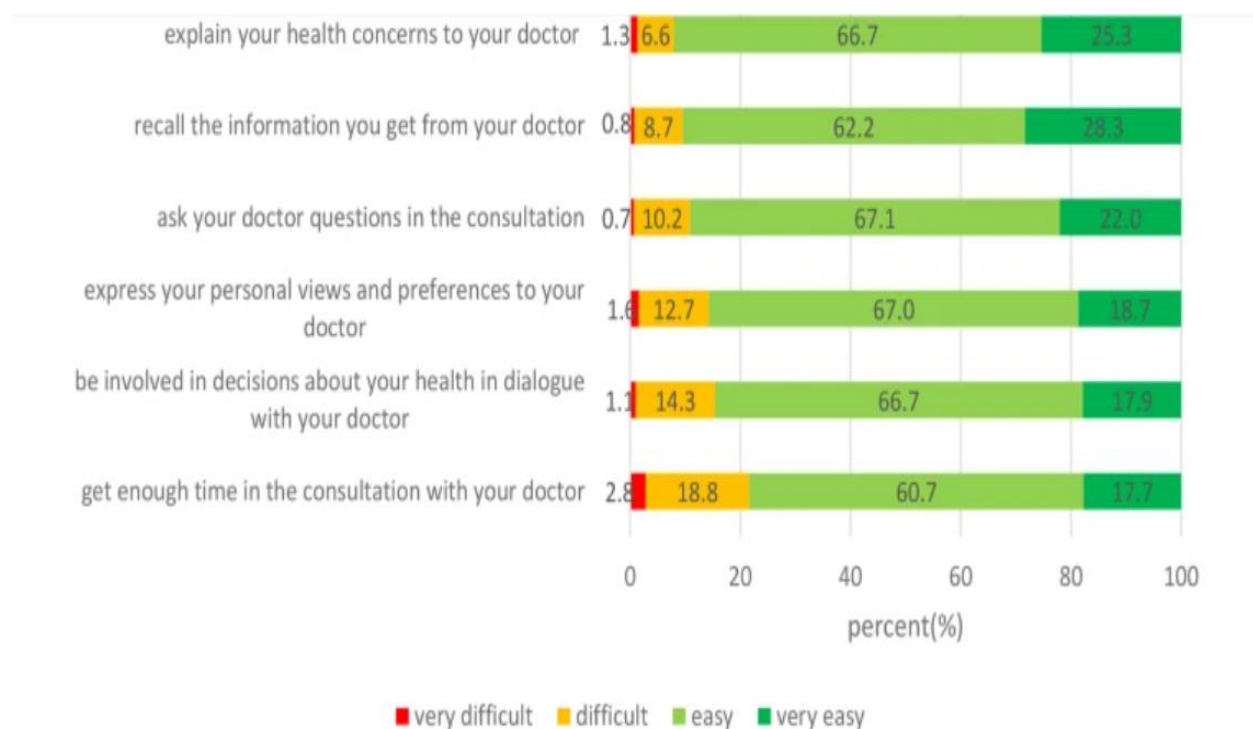
	Item 1	Item 2	Item 3	Item 4	Item 5	Item 6
Item 1: Explain your health concern to your doctor	-					
Item 2: Get enough time in the consultation with your doctor	0.57 (p<0.001)	-				
Item 3: Express your personal views and preferences to your doctor	0.64 (p<0.001)	0.63 (p<0.001)	-			
Item 4: Ask your doctor questions in the consultation	0.60 (p<0.001)	0.58 (p<0.001)	0.67 (p<0.001)	-		
Item 5: Be involved in decisions about your health in dialogue with your doctor	0.53 (p<0.001)	0.56 (p<0.001)	0.64 (p<0.001)	0.68 (p <0.001)	-	
Item 6: Recall the information you get from your doctor	0.41 (p<0.001)	0.35 (p<0.001)	0.47 (p<0.001)	0.48 (p<0.001)	0.50 (p<0.001)	-
M	3.17	2.95	3.05	3.13	3.04	3.21
SD	0.58	0.69	0.61	0.58	0.61	0.59

M: mean, SD: standard deviation

4.1.3 The communicative health literacy of the Hungarian adults

The weighted mean score for the COM-HL scale was 86.8 (95% CI: 84.8-88.8). The weighted mean score on the COM-HL scale was lowest among individuals experiencing financial deprivation, poor social support, and lowest social status, whereas the highest scores were observed among those receiving strong social support and living without financial deprivation (see Table 6). The task perceived as the most difficult was “*to get enough time in the consultation with your doctor*”, with 21.6% of the respondents rating it as (very) difficult. The task “*to be involved in decisions about your health in dialogue with your doctor*” was rated as the second most difficult, with 15.4% of the vote in the (very) difficult category. In contrast, the task rated as the least difficult was “*to explain your health concern to your doctor*” with only 7.9% indicating it as (very) difficult. A detailed overview of these results is presented in Figure 1.

Figure 1 Percentage of answers on each item of the Hungarian communicative health literacy scale weighted by age, sex, education level, and settlement type



Note: Introductory question was: “On a scale from very easy to very difficult, how easy would you say it is for you to...”

Table 6 The weighted mean score of the Hungarian communicative health literacy scale by the key sample subgroups

		Weighted mean*(95% CI)
Sex	Male	88.8 (85.1–92.4)
	Female	85.1 (81.5–88.7)
Age groups	18-25 years	84.2 (77.7–90.7)
	26-35 years	86.9 (75.1–98.7)
	36-45 years	84.1 (80.5–87.8)
	46-55 years	89.8 (87.5–92.2)
	56-65 years	86.7 (82.7–90.6)
	66-75 years	89.6 (82.1–97.2)
	76 + years	84.1 (76.8–91.4)
Level of education	Highest primary education	84.6 (83.4–85.9)
	Lower secondary education	89.1 (86.3–91.9)
	Upper secondary education	89.6 (79.8–99.4)
	Tertiary education	88.6 (80.6–96.6)
Training in a health profession	Yes	88.5 (79.7–97.3)
	No	86.3 (86.1–86.5)
Financial deprivation	Deprived	79.2 (74.8–83.6)
	Non-deprived	90.7 (89.1–92.4)
Childrearing	Yes	86.6 (76.7–96.6)
	No	86.9 (84.8–89.1)
Self-perceived health	Bad or very bad	82.8 (69.0-96.7)
	Fair	85.1 (78.8–91.4)
	Good or very good	88.8 (86.4–90.8)
Perceived social status	Low (score below 5)	80.9 (76.5–85.2)
	Normal (score above 4)	89.0 (85.3–92.7)
Social support	Poor	79.5 (72.1–86.9)
	Moderate	86.2 (8.20–89.3)
	Strong	92.0 (86.4–97.6)

*: weighted by age, sex, education and settlement type, 95% CI: 95% confidence interval

4.1.4 The determinants of communicative health literacy in Hungarian adults

Based on the results of the regression analysis, COM-HL was significantly associated with sex, i.e., lower in females than males (β : -2.89, $p < 0.036$). It was significantly higher in adults aged 66-75 years (β : 8.39, $p < 0.013$), individuals without financial deprivation (β : 6.90, $p < 0.001$), and those with strong social support (β : 8.00, $p < 0.001$). No statistically significant associations were identified between COM-HL and other variables (see Table 7).

Table 7 Factors influencing communicative health literacy of Hungarian adults based on multivariate linear regression

Dependent variables	β^* (95% CI)	p -value
Sex (ref: male)	-2.89 (-5.58;-0.19)	0.036
Age groups (ref:18-25 years)		
26-35 years	3.63 (-2.82;10.08)	0.270
36-45 years	2.31 (-4.36;8.98)	0.498
46-55 years	5.93 (-0.67;12.52)	0.078
56-65 years	5.46 (-1.23;12.15)	0.109
66-75 years	8.39 (1.77;15.01)	0.013
76 + years	5.29 (-2.19;12.77)	0.165
Education (ref: primary education)		
Lower secondary education	-0.13 (-4.54;4.27)	0.952
Upper secondary education	3.00 (-1.27;7.28)	0.168
Tertiary education	-1.90 (-6.76;2.95)	0.168
Self-perceived health (ref: bad/very bad)		
Fair	0.01 (-5.00;5.01)	0.998
Good/very good	1.55 (-3.70;6.81)	0.563
Lack of financial deprivation (ref: deprivation)	6.90 (3.71;10.08)	<0.001
Social support (ref: poor)		
Moderate	3.05 (-0.74;6.85)	0.155
Strong	8.00 (3.83;12.17)	<0.001

β (95% CI): linear regression coefficient (95% confidence interval), ref: reference category

*: Adjusted for social status, childrearing, and training in a health profession.

Significant results are highlighted in bold.

4.1.5 The effect of communicative health literacy in Hungarian adults

Higher COM-HL was positively associated with daily physical activity (OR = 2.68; 95% CI = 1.39–5.17) and daily fruit and vegetable consumption (OR = 2.05; 95% CI = 1.13–3.70), while decreased the odds of limitation by health problems (OR = 0.41; 95% CI = 0.21–0.80) (Table 8a and 8b).

Table 8a The effect of communicative health literacy on health behaviour in Hungarian adults based on multivariate logistic regression

	Being non-smoker OR (95% CI)	Being non-drinker OR (95% CI)	Daily physical activity OR (95% CI)	Daily fruit and vegetable consumption OR (95% CI)
Communicative health literacy	0.66 (0.35–1.27)	1.02 (0.55–1.87)	2.68 (1.39–5.17)	2.05 (1.13–3.70)
Female (ref.: male)	1.33 (1.00–1.77)	4.30 (3.26–5.68)	1.12 (0.85–1.47)	1.76 (1.35–2.29)
Age	1.04 (1.03–1.05)	1.00 (0.99–1.01)	1.00 (0.99–1.01)	1.02 (1.02–1.03)
Self-perceived social status	1.20 (1.08–1.33)	1.02 (0.92–1.12)	0.90 (0.81–0.99)	1.09 (0.99–1.20)
Education: vocational (ref.: primary or less)	1.19 (0.76–1.85)	1.01 (0.65–1.57)	1.53 (0.99–2.35)	1.65 (1.07–2.53)
Education: secondary (ref.: primary or less)	1.10 (0.71–1.71)	0.62 (0.41–0.95)	0.91 (0.59–1.40)	1.72 (1.13–2.61)
Education: University or higher (ref.: primary or less)	1.55 (0.93–2.59)	0.62 (0.38–1.00)	1.12 (0.69–1.82)	1.80 (1.12–2.88)
Not deprived financially (ref.: deprived)	1.15 (0.82–1.60)	0.88 (0.64–1.20)	0.83 (0.60–1.14)	0.99 (0.72–1.36)
Childrearing (ref.: no)	1.30 (0.91–1.87)	0.76 (0.54–1.07)	0.85 (0.60–1.21)	1.29 (0.92–1.81)
Trained in health care profession (ref.: yes)	1.24 (0.90–1.72)	0.82 (0.60–1.12)	0.69 (0.51–0.94)	0.85 (0.62–1.15)
Social support: moderate (ref.: poor)	1.09 (0.74–1.62)	0.90 (0.61–1.32)	1.33 (0.89–1.98)	1.13 (0.78–1.63)
Social support: strong (ref.: poor)	0.99 (0.64–1.53)	0.84 (0.55–1.28)	1.86 (1.20–2.86)	2.14 (1.42–3.22)
Health status: fair (ref.: bad)	0.93 (0.55–1.56)	0.32 (0.19–0.55)	1.25 (0.76–2.07)	1.72 (1.06–2.81)
Health status: good (ref.: bad)	1.39 (0.80–2.41)	0.38 (0.22–0.66)	1.18 (0.70–2.00)	2.06 (1.23–3.46)
Pseudo-R ²	0.114	0.196	0.059	0.134

OR (95 %CI): odds ratios and the corresponding 95% confidence intervals, ref: reference category. Significant differences are indicated in bold.

Table 8b The effect of communicative health literacy on health status in Hungarian adults based on multivariate logistic regression

	(Very) good self-perceived health status OR (95% CI)	Having chronic health problem OR (95% CI)	Limitation by health problems OR (95% CI)
Communicative health literacy	1.44 (0.76–2.74)	0.95 (0.51–1.77)	0.41 (0.21–0.80)
Female (ref.: male)	0.96 (0.73–1.28)	1.09 (0.82–1.43)	1.24 (0.90–1.72)
Age	0.96 (0.95–0.97)	1.05 (1.04–1.06)	1.04 (1.03–1.05)
Self-perceived social status	1.17 (1.06–1.30)	0.92 (0.83–1.02)	0.98 (0.87–1.10)
Education: vocational (ref.: primary or less)	0.96 (0.61–1.52)	1.07 (0.68–1.68)	0.83 (0.51–1.35)
Education: secondary (ref.: primary or less)	1.08 (0.69–1.68)	1.21 (0.77–1.89)	0.69 (0.42–1.11)
Education: University or higher (ref.: primary or less)	1.76 (1.06–2.90)	1.15 (0.70–1.90)	0.65 (0.37–1.14)
Not deprived financially (ref.: deprived)	2.43 (1.77–3.34)	0.50 (0.36–0.69)	0.39 (0.27–0.55)
Childrearing (ref.: no)	0.86 (0.60–1.22)	1.01 (0.71–1.45)	1.23 (0.80–1.88)
Trained in health care profession (ref.: yes)	0.83 (0.60–1.14)	0.94 (0.68–1.29)	0.99 (0.68–1.44)
Social support: moderate (ref.: poor)	1.31 (0.89–1.95)	0.75 (0.51–1.11)	0.54 (0.35–0.83)
Social support: strong (ref.: poor)	1.51 (0.97–2.33)	0.95 (0.62–1.46)	0.64 (0.40–1.02)
<i>Pseudo-R²</i>	<i>0.267</i>	<i>0.240</i>	<i>0.215</i>

OR (95 %CI): odds ratios and the corresponding 95% confidence intervals, ref: reference category. Significant differences are indicated in bold.

4.2 Survey 2 – Angolan survey

4.2.1 Characteristics of the sample

A total of 1839 participants were included in our analysis. Table 9 shows the weighted distribution of the study parameters. The mean age of the respondents was 30.1 years, with a range of 18 to 88 years (SD: 12.3 years). With regard to sex, the majority of respondents were female (53.6%), and 57.7% reported residing in urban areas. Nearly half of the participants (48.8%) had attained either lower or upper secondary education. Around half (53.9%) of the participants were categorised as employed, encompassing individuals who were employed, self-employed, or involved in domestic

tasks. Only 20.2% of the participants were trained in a health profession. In relation to self-perceived health status, 41.9% of participants indicated fair health status. 76.4% of respondents were classified as financially deprived, and 80.3% perceived themselves as belonging to a lower social stratum.

Table 9 Sociodemographic parameters and self-perceived health of the Angolan sample

		Weighted proportion (%)* (95% CI)
Sex	Male	46.4% (44.2% - 48.7%)
	Female	53.6% (51.3% - 55.8%)
Area of residence	Urban	57.7% (55.4% - 59.9%)
	Rural	42.3% (40.1% - 44.6%)
Age groups	18-29 years	48.0% (45.8% - 50.4%)
	30-49 years	34.3% (32.2% - 36.6%)
	50-69 years	13.3% (11.8% - 14.9%)
	70 + years	4.3% (3.4 - 5.3%)
Level of education	No formal education	24.0% (22.1% - 26.0%)
	Primary education	20.7% (18.9% - 22.6%)
	Lower secondary education	23.4% (21.5% - 25.4%)
	Upper secondary education	25.4% (23.5 - 27.5%)
	Higher education	6.5% (5.4% - 7.7%)
Training in a health profession	Yes	20.2% (18.4% - 22.1%)
	No	69.0% (66.9% - 71.1%)
	Do not know/do not want to answer	10.8% (9.5% - 12.3%)
Financial deprivation	Deprived	76.4% (74.2% - 78%)
	Non-deprived	23.6% (21.6% - 25.8%)
Self-perceived health	Very good	8.7% (7.5% - 10.1%)
	Good	23.5% (21.6% - 25.5%)
	Fair (i.e., neither good nor bad)	41.9% (39.7% - 44.2%)
	Bad	10.5% (9.2% - 12.0%)
	Very bad	7.6% (6.5% - 8.9%)
	Do not know/do not want to answer	7.8% (6.6% - 9.1%)
Perceived social status	Low (score below 5)	80.3% (78.4% - 82.1%)
	Normal (score above 4)	19.7% (17.9% - 21.6%)
Occupational status	Employed	20.8% (19.0% - 22.7%)
	Self-employed	25.0% (23.1% - 27.0%)
	Unemployed	23.0% (21.1% - 25.0%)
	Retired	1.9% (1.4% - 2.6%)
	Student/trainee	15.3% (13.7% - 17.0%)
	Domestic tasks	8.1% (7.0 - 9.5%)
	Do not know/do not want to answer	5.8% (4.8% - 7.0%)

*: weighted by age, sex, education and area of residence, 95% CI: 95% confidence interval

4.2.2 Measurement properties of the questionnaire

4.2.2.1 Reliability tests

The internal consistency of the total sample measured by Cronbach's Alpha was 0.86, while the split-half reliability, assessed using the Spearman-Brown correlation coefficient, yielded a value of 0.83, as shown in Table 10. Cronbach's alpha value ranged from 0.15 in the 70+ years age group to 0.92 among individuals performing domestic tasks. Meanwhile, the Spearman-Brown correlation coefficient ranged from 0.55 for participants aged 70 years and above to 0.91 for those involved in domestic tasks. Additional details about the other subsamples are presented in Table 10.

Table 10 Cronbach's alpha values and Spearman-Brown correlation coefficients for the total Angolan sample and subsamples

		Cronbach's alpha	Spearman-Brown coefficient
Total sample		0.86	0.83
Sex	Males	0.87	0.85
	Females	0.85	0.82
Area of residence	Urban	0.85	0.81
	Rural	0.86	0.85
Age groups	18-29 years	0.88	0.84
	30-49 years	0.82	0.80
	50-69 years	0.88	0.90
	70+ years	0.15	0.55
Level of education	No formal education	0.86	0.89
	Primary education	0.84	0.77
	Lower secondary education	0.87	0.84
	Upper secondary education	0.81	0.79
	Higher education	0.88	0.86
Trained in a health profession	Yes	0.87	0.79
	No	0.84	0.83
Financial deprivation	Deprived	0.83	0.81
	Non-deprived	0.86	0.85
Perceived social status	Low (score below 5)	0.84	0.81
	Normal (score above 4)	0.84	0.84
Occupational status	Employed	0.86	0.87
	Self-employed	0.87	0.81
	Unemployed	0.84	0.83
	Retired	0.43	0.74
	Student/trainee	0.82	0.73
	Domestic tasks	0.92	0.91

An analysis was performed to assess the impact of removing individual items on Cronbach's Alpha, and the results indicated that doing so led to an increase in the overall reliability coefficient. In all instances, the item-total correlation coefficient exceeded the established minimum threshold of 0.30. The lowest values were observed in item 2 with 0.60 and 0.61 for items 6, respectively, while the highest was for items 1 and 3 (see Table 11).

Table 11 Analysis of the correlation between the individual items and the whole Portuguese communicative health literacy scale

Items of the scale	Cronbach's alpha after deleting this item	Item-total correlation coefficient
Item 1: Explain your health concern to your doctor	0.82	0.68
Item 2: Get enough time in the consultation with your doctor	0.84	0.60
Item 3: Express your personal views and preferences to your doctor	0.82	0.68
Item 4: Ask your doctor questions in the consultation	0.83	0.66
Item 5: Be involved in decisions about your health in dialogue with your doctor	0.83	0.63
Item 6: Recall the information you get from your doctor	0.84	0.61

4.2.2.2 Explanatory factor analyses

As indicated by the results of the principal component analysis, the items of the instrument belong to a single factor (Bartlett-test<0.001; Kaiser-Meyer-Olkin value: 0.843), which explains 58.1% of the total variance (see Table 12).

Table 12 Result of the principal component analysis of the Portuguese communicative health literacy scale

Items of the scale	Factors	Uniqueness
Item 1: Explain your health concern to your doctor	0.79	0.62
Item 2: Get enough time in the consultation with your doctor	0.72	0.52
Item 3: Express your personal views and preferences to your doctor	0.79	0.62
Item 4: Ask your doctor questions in the consultation	0.78	0.61
Item 5: Be involved in decisions about your health in dialogue with your doctor	0.75	0.57
Item 6: Recall the information you get from your doctor	0.74	0.54
Variance	3.49	
Variance proportion (%)	58.13	

The inter-item Spearman's bivariate correlation coefficients ranged from 0.30 to 0.55. The lowest correlation was between item 2 and 6. More details are displayed in Table 13.

Table 13 Spearman's bivariate correlations between the items of the Portuguese communicative health literacy scale

	Item 1	Item 2	Item 3	Item 4	Item 5	Item 6
Item 1: Explain your health concern to your doctor	-					
Item 2: Get enough time in the consultation with your doctor	0.50 (p<0.001)	-				
Item 3: Express your personal views and preferences to your doctor	0.43 (p<0.001)	0.52 (p<0.001)	-			
Item 4: Ask your doctor questions in the consultation	0.55 (p<0.001)	0.41 (p<0.001)	0.55 (p<0.001)	-		
Item 5: Be involved in decisions about your health in dialogue with your doctor	0.45 (p<0.001)	0.47 (p<0.001)	0.51 (p<0.001)	0.53 (p<0.001)	-	
Item 6: Recall the information you get from your doctor	0.52 (p<0.001)	0.30 (p<0.001)	0.41 (p<0.001)	0.46 (p<0.001)	0.37 (p<0.001)	-
M	2.71	2.16	2.38	2.56	2.35	2.82
SD	0.88	0.95	0.89	0.94	0.91	0.82

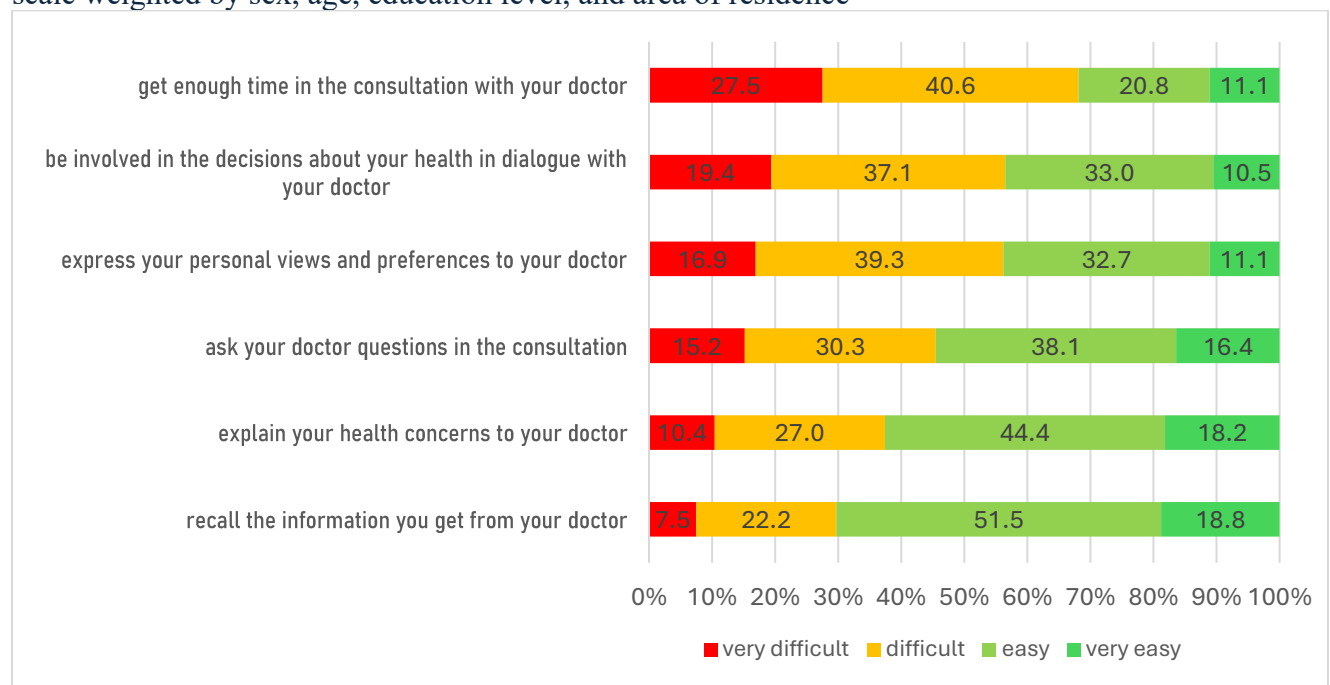
M: mean, SD: standard deviation

4.2.3 The communicative health literacy of the Angolan adults

The weighted mean score of the COM-HL scale was 49.9 (95%CI 48.83 – 50.97). The lowest mean score of COM-HL scale was observed among individuals aged 70 years and above, those with very poor health, and residents of rural areas. Concomitantly, participants with no formal education had slightly lower scores. The highest mean score of the COM-HL scale was observed among individuals with higher education attainment, those engaged in academic or vocational training, those reporting normal social status, and individuals not experiencing financial deprivation (see Table 14).

Based on the results displayed in Figure 2, the most challenging task was “*to get enough time in the consultation with your doctor*”, which nearly 28% of respondents rated it as very difficult, and only 11.1% rated it as very easy. The second most difficult task was “*to be involved in decisions about your health in the dialogue with your doctor*”, with 19.4% of respondents rating it as very difficult, followed by the task “*to express your personal views and preferences to your doctor*”. The easiest task was “*to recall the information you get from your doctor*”, where 18.8 % of respondents rated it as very easy and 7.5% rated it as very difficult.

Figure 2 Percentage of responses to each item of the Portuguese communicative health literacy scale weighted by sex, age, education level, and area of residence



Note: Introductory question: “On a scale from very easy to very difficult, how easy would you say it is for you to...”

Table 14 Mean score of the Portuguese communicative health literacy scale by the key sample subgroups weighted by age, sex, level of education, and area of residence

		Weighted mean score* (95% CI)
Total mean score		49.90 (48.83 – 50.97)
Sex	Male	49.71 (48.09 – 51.33)
	Female	50.06 (48.63 – 51.81)
Area of residence	Urban	53.95 (52.53 – 55.37)
	Rural	44.53 (42.98 – 46.08)
Age groups	18-29 years	50.13 (48.45 – 51.81)
	30-49 years	51.64 (49.95 – 53.34)
	50-69 years	49.24 (46.38 – 52.09)
	70 + years	36.56 (34.51 – 38.61)
Level of education	No formal education	42.24 (40.08 – 44.41)
	Primary education	53.11 (50.94 – 55.28)
	Lower secondary education	51.32 (48.94 – 53.71)
	Upper secondary education	52.35 (50.39 – 54.32)
	Higher education	55.52 (51.64 – 59.83)
Training in a health profession	Yes	52.52 (50.01 – 55.03)
	No	50.67 (49.43 – 51.91)
Financial deprivation	Deprived	48.83 (47.61 – 50.06)
	Non-deprived	54.59 (52.02 – 57.16)
Self-perceived health	Very good	47.30 (43.15 – 51.46)
	Good	53.18 (51.04 – 55.32)
	Fair (i.e., neither good nor bad)	51.32 (49.76 – 52.89)
	Bad	51.90 (49.45 – 54.34)
	Very bad	40.80 (36.70 – 44.98)
Perceived social status	Low (score below 5)	49.54 (48.34 – 50.74)
	Normal (score above 4)	54.51 (52.27 – 56.76)
Occupational status	Employed	51.02 (48.59 – 53.45)
	Self-employed	49.19 (46.95 – 51.43)
	Unemployed	49.07 (46.79 - 51.35)
	Retired	50.58 (45.96 – 55.21)
	Student/trainee	55.02 (52.46 – 57.58)
	Domestic tasks	49.15 (45.81 – 52.50)

*: weighted by age, sex, education and area of residence, 95% CI: 95% confidence interval

4.2.4 The determinants of communicative health literacy in Angolan adults

As per the results of regression analysis, COM-HL was positively associated with living in urban areas (β : 4.716, $p < 0.001$), not having financial deprivation (β : 4.446, $p < 0.001$), being in a good health condition (very good (β : 8.836, $p < 0.002$), good (β : 8.164, $p < 0.001$) and fair (β : 4.821, $p < 0.014$)). Also, higher levels of COM-HL were positively associated with being retired or engaged in domestic tasks (β : 5.967, $p < 0.041$). No significant associations were found between COM-HL and variables such as sex, age, educational level, being trained in a health profession, and perceived social status (Table 15).

Table 15 The determinants of communicative health literacy of Angolan adults based on multivariate linear regression

Dependent variables		β (95% CI)	p-value
Sex: male (ref: female)		-0.35 (-2.59 – 1.91)	0.764
Age		0.01 (-0.10 – 0.12)	0.905
Education level (ref: higher education)	Primary education or less	-1.29 (-7.80 – 5.21)	0.697
	Lower secondary education	-3.00 (-6.94 – 0.94)	0.135
	Upper secondary education	-0.16 (-3.11 – 2.79)	0.915
Area of residence: urban (ref: rural)		4.72 (2.31 – 7.13)	<0.001
Trained in a health profession (ref: no)		-0.13 (-2.61 – 2.35)	0.920
No financial deprivation (ref: deprived)		4.45 (1.74 – 7.15)	<0.001
Normal perceived social status (ref: low)		2.28 (-0.29 – 4.86)	0.083
Perceived health (ref: bad/very bad)	Very good	8.84 (3.32 – 14.35)	<0.001
	Good	8.16 (3.99 – 12.34)	<0.001
	Fair	4.82 (0.99 – 8.65)	<0.014
Occupational status (ref: unemployed)	Employed	0.19 (-3.30 – 3.68)	0.915
	Self-employed	2.05 (-1.59 – 5.69)	0.270
	Retired or domestic tasks	5.97 (0.25 – 11.69)	0.041
	Student/trainee	1.39 (-2.21 – 4.98)	0.449

* β (95% CI): linear regression coefficient (95% confidence interval), ref: reference category. Significant results are highlighted in bold.

5. DISCUSSION

The general objective of the two surveys carried out is to evaluate communicative health literacy in the adult population. Regarding specific objectives, Survey 1 aimed to assess the psychometric properties of the Hungarian version of the COM-HL instrument, to delineate the COM-HL profile among Hungarian adults aged 18 years and above, identify its associated determinants, and to investigate the association between COM-HL and various health-related outcomes in Hungarian adults. On the other hand, the specific objectives of Survey 2 were to assess the psychometric properties of the Portuguese version of the COM-HL instrument, describe the COM-HL profile among Angolan adults aged 18 years and above, and find its associated determinants.

5.1 Survey 1 – Hungarian survey

The instrument demonstrated strong reliability and internal consistency, with both Cronbach's alpha and Spearman–Brown coefficients at 0.87, indicating that all items consistently measure the same construct and require no modification. Principal factor analysis supported a single-factor structure aligned with the COM-HL model, confirmed by a significant Bartlett's test, a high KMO value, and moderate to strong inter-item correlations. Overall, the scale shows robust measurement properties and is suitable for assessing COM-HL in the Hungarian adult population.

In other countries participating in the HLS19 international survey, Cronbach's alpha was between 0.84 and 0.90 [8, 22]. However, it is important to emphasise that countries had different data collection methods, which might have influenced the results. In our study, the Cronbach's alpha was similar to that reported in the Swedish C&CHL study (0.87), higher than for the German FC&CHL (0.77) and the AAHL (0.69) instrument [19, 20, 21]. However, because these studies used different scales and did not focus exclusively on COM-HL items, they offer limited value for direct comparison with the more specific scope of the HLS19-COM-P scale. In connection with the principal component analysis, our study showed that all the items loaded into a single factor, similarly to the results of other HLS19 studies [8, 22].

Based on the results, Hungarian adults scored an average of 86.8 points on the COM-HL scale. In terms of COM-HL profiles, it seems that Hungarian adults are doing slightly better compared to many European countries, the mean score of the HLS19 international survey was 83.2 [8, 22].

The response distribution for the COM-HL items shows that a high percentage of respondents (nearly 20%) in the study experienced difficulties related to the limited time available during their

medical consultations. This finding largely reflects the pattern reported in the HLS19 study [8, 22]. However, in France and the Czech Republic, other aspects of communication posed greater challenges, specifically “to be involved in the decision about your health in dialogue with the doctor” and “to express your personal views and preferences” [8, 22].

Regarding the determinants of COM-HL, the study results show that sex: being male, age: being 66-75 years, experiencing no financial deprivation, and having strong social support were all significantly and positively associated with COM-HL. Our results were consistent with those from nine European countries [24], showing positive associations between COM-HL and male sex, older age, and the absence of financial deprivation. Unlike some countries [24], we found no association with social status; instead, COM-HL was associated with having strong social support. The occurrence of lower COM-HL skills among females is quite frequent. Studies from Ethiopia and Senegal found that being female was linked to lower COM-HL skills [17, 43]. Perhaps this pattern is linked to the fact that in many countries, particularly more conservative ones, males tend to have higher education attainment compared to females. Nonetheless, other studies and commonly observed patterns in domains such as finding information and interacting with healthcare professionals suggest that women often outperform men in specific aspects of COM-HL [49, 50].

With regard to education, COM-HL was not associated with education in the present study, despite the general trend of higher education being linked to higher COM-HL skills. Consistent with these findings, the same pattern was confirmed in some European countries [24], although in some other countries, they found an association between COM-HL and education [17, 24]. Despite these across-country disparities, education has consistently been a crucial factor in improving social skills [51, 52], including COM-HL.

Regarding the effect of COM-HL, our study found associations with health status and health behaviour. Higher COM-HL was positively associated with daily physical activity and fruit and vegetable consumption, as well as with lower odds of health-related limitations. These patterns were consistent with findings from other studies, particularly for physical activity and health behaviours [32, 34].

5.2 Survey 2 – Angolan survey

The instrument showed good reliability and internal consistency, with a Cronbach's alpha of 0.86 and a Spearman–Brown split-half coefficient of 0.83, indicating that all items consistently measure the same construct and require no modification. Principal factor analysis supported a single-factor structure consistent with the COM-HL model, confirmed by a significant Bartlett's test, an adequate KMO value, and moderate inter-item correlations. Overall, the scale demonstrated strong measurement properties and is suitable for assessing COM-HL in the Angolan adult population. The psychometric properties of the questionnaire were acceptable even among those with no formal education. However, it may be worthwhile checking the comprehensibility of the instrument in this subpopulation and/or offering interviewer assistance to this group during data collection. The Cronbach's Alpha value of the Portuguese COM-HL instrument was close to those observed in most countries that participated in the HLS19 international survey [8, 22]. The characteristics mentioned above demonstrated how well the validated Portuguese version of the instrument fits the Angolan context.

Based on the survey results, the COM-HL profile of Angolan adults is relatively low. The mean score of the COM-HL scale for Angolan adults was 49.9. Interestingly, the average level of COM-HL among Angolan adults is much lower than the Hungarian results (mean score: 86.8). However, direct comparison is not meaningful, given that the two countries have a huge difference in terms of social and economic background that may influence the scores. Findings revealed a substantial disparity in the profiles of the COM-HL score between Survey 2 and the other eight countries that were also part of the HLS19 [8, 22]. Such disparities in COM-HL profiles support the theory that COM-HL levels and its determinants vary significantly across countries. Also, it emphasises once again the need for continuous and more in-depth research.

Regarding the percentage of answers in each item of the COM-HL scale, the findings show that the item “getting enough time during consultation” was the most challenging task, with 27.5% of the respondents voting for the option very difficult. This pattern was consistent with most of the countries in the HLS19 and in Hungary as well [8, 22]. Besides patients complaining about not having enough time during consultations, studies also suggest that patients struggle with the complex language used by physicians during consultations [50]. Interestingly, both patients with

high and low COM-HL skills complained about the limited time and complex language during the consultation [50].

In relation to factors associated with COM-HL, the survey results show that COM-HL was significantly and positively associated with lack of financial deprivation, living in urbanised areas, good health status, being retired, and working as a domestic. Regarding the residence area, studies also confirm that better COM-HL skills are linked with living in urban areas or bigger towns, for example, with more than twenty thousand people [17, 23]. In fact, living in urban areas was associated with higher levels not only of COM-HL but also of overall HL, as evidenced by a systematic review across both developing and developed countries [17, 52]. Financial deprivation seems to be the most common issue. It was correlated with COM-HL in both of our surveys (Survey 1 and 2). Moreover, several studies have reported a similar pattern, including a study from Ethiopia [17].

Based on the survey results, no significant associations were found between COM-HL, age, sex, and education. However, elderly people scored lower compared to other age groups, and in some studies, COM-HL was correlated with age, especially being older [8, 24, 32, 43]. In the case of educational attainment, individuals with the highest level of education tended to have higher COM-HL scores. This pattern was similarly found, for example, in the Ethiopian study [17]. In contrast, the HLS19 study found that these trends varied across countries; that is, in some countries, COM-HL was significantly associated with education levels, but in some other countries, it was not the case [8, 24]. Although our results found no correlation between education level and COM-HL, education remains vital for developing basic skills. For example, even decades ago, studies showed that individuals with little or no formal education faced more barriers to accessing healthcare services [10]. Regarding sex, we did not find an association with COM-HL, and the scores were nearly the same, though males tended to score slightly higher. However, a COM-HL study in Ethiopia among patients with NCDs found that the only domain of COM-HL that was linked with being a female is the lower likelihood of actively managing their health [17]. In contrast, the study conducted in Senegal found that men were responsible for making over half of the decisions related to women's medical treatment, primarily due to women's low levels of COM-HL [43].

While not the primary focus of this study, it is important to emphasise that having sources of information, such as clinicians and general practitioners, can help improve an individual's COM-HL [49, 51]. For instance, it was found that women who obtained breastfeeding information from obstetricians had higher overall scores on breastfeeding HL and, particularly, higher scores on COM-HL and decision-making than those without a source of information [51].

However, in many low- and middle-income countries, such services are scarce. Most of the time, people rely on television, websites, social networking services, smartphone applications, newspapers, friends, family members, co-workers, and, for some, healthcare providers and clinics [37, 42]. The dilemma lies in an individual's ability to communicate effectively and apply the information obtained from various sources in co-producing their health, which requires COM-HL skills – skills that many people from diverse backgrounds have been shown to struggle with.

5.3 Strengths and limitations

It is important to acknowledge that there are certain limitations inherent in the studies. Primarily, we cannot determine the cause-and-effect relationship because the findings and conclusions are based on a cross-sectional study design. Secondly, in the case of Survey 1, we employed computer-assisted telephone interviews (CATI) as its data collection method, and pen-and-paper personal interviews (PAPI) was employed in the case of Survey 2. Nevertheless, it is important to recognise that the employability of alternative data collection methods may have an impact on the comparability of the results. However, based on the results of the HLS19 [22], the psychometric properties of the COM-HL instrument did not differ greatly between countries, even though they used different data collection methods. Though additional research would be useful to investigate the potential effect of different data collection methods. In addition, the scope of the tool was limited to exploring COM-HL challenges between physician and patient interaction, rather than healthcare professionals more broadly. The real sources of the difficulties with perceived communication are unclear, as they may reflect issues with physicians or the healthcare system in general. In order to gather insights into these aspects, earlier Hungarian studies have used patient-reported experiences [53] and evaluations of shared decision making [54, 55]. On the contrary, the studies included in this dissertation only focused on examining the patient's perspective. In the case of Survey 2, given the socio-geographical limitations, list-based random sampling could not

be implemented, which could potentially introduce sample bias. However, post-stratification weights were applied to correct sample imbalances.

A key strength of the research work lies in its strict compliance with international methodological guidelines during the planning, nationwide sampling, and data collection phases, which likely contributed to minimising the risk of possible systematic errors in Survey 1. In the case of Survey 2, to our knowledge, the study constitutes the first systematic investigation of COM-HL in the Angolan context. Moreover, the sampling framework was derived from the national Angolan population census, thereby enhancing the representativeness of the sample in relation to the general adult population. Even though a direct comparison between the two countries was not the aim, it should be noted that the cultural, linguistic and systemic differences between Hungary and Angola could affect the COM-HL measurement. Angola is a multicultural and linguistically diverse country. Although Portuguese is the official language, not everyone is fluent in it, as proficiency depends on factors such as educational attainment. In contrast, Hungary is monolingual, but this does not necessarily mean that everyone can properly understand the questions. Therefore, a pilot study was carried out in both countries before the main survey to check the comprehensibility of the questionnaire. Of course, besides poor language proficiency, other factors can also impact doctor–patient communication, such as cultural differences in health models and beliefs about the causes of illness, differences between individualistic and collectivistic cultures, and differences in the acceptance of medical paternalism [56]. In contrast to previous limited studies conducted in Africa, our study is the first to employ an internationally validated instrument specially developed to assess COM-HL in the population aged 18 years and above.

5.4 Policy implications and recommendations

Our results clearly suggest that patient-physician communication should be improved. The evidence shows the presence of several communicative barriers. Primarily, this is because patients feel they do not have enough time during the consultation with the doctor.

The findings therefore imply that a strategy to improve communications between physician and patient should be implemented. More effective communications would also help to address the most problematic issue of not having enough time: whatever time is available to patients for consultation would be used as effectively as possible.

Such a strategy could focus on the development of healthcare professionals' communicative competencies. Specifically, this might include the use of visual aids, the incorporation of evidence-based strategies such as the “teach-back” [57] or “chunk-and-check” methods [58], as well as the use of plain language. Additionally, the presence of health mediators during patient-physician interactions, in clinical consultations and in healthcare settings has been shown to facilitate more effective communication (i.e. between patients and healthcare providers) [59]. Similarly, the implementation of structured patient education initiatives such as the “Ask me 3” program [60], which prompts patients to ask their healthcare providers about their main concern, the recommended course of action, and the rationale behind it can promote patients' engagement and improve the clarity of health information conveyed during consultation. Beyond these approaches, the use of pre-visit preparation tools, for example, the use of questionnaires or digital portals allowing patients to list symptoms, concerns, or questions in advance, may help optimise consultation time and ensure that patient priorities are addressed. Post-consultation support, such as written summaries, follow-up messages, or access to reliable educational resources, can further reinforce understanding and adherence.

In fact, evidence shows that COM-HL plays a positive and significant role in shaping the quality of life (QoL) of people living with diabetes [27]. From a policy perspective, the findings underscore the importance of integrating COM-HL considerations into national health strategies, chronic disease management programs, and primary healthcare reforms. Investing in policies that promote COM-HL may contribute to improved population health outcomes, reduced healthcare costs, and more sustainable health systems, particularly in resource-constrained settings. Finally, according to our observations, there is very limited literature in low- and middle-income countries on COM-HL, especially in Africa. Therefore, further research is needed in the field in order to determine the actual levels and determinants of COM-HL and inform the best policy decisions to improve healthcare services and outcomes.

6. CONCLUSION

Both the Hungarian and Portuguese questionnaires demonstrated strong internal consistency, indicating their appropriateness for assessing COM-HL within the Hungarian and Angolan adult population. The mean score of COM-HL was much higher among Hungarian adults and lower among Angolan adults. In both populations, to get enough time during the consultation with your

doctor was highlighted as the most difficult task. In both surveys, the main factor negatively influencing COM-HL was financial deprivation.

In relation to the perception of not getting enough time in the consultation, a possible solution could include establishing health educators and mediators in healthcare services in the short term. However, in the long term, improving communication skills of patients and healthcare professionals would be the best solution to make healthcare navigation simple and more effective. Because time can be perceived as not enough by patients and maybe perceived as enough for physicians, it is advisable that special attention should be given to vulnerable groups.

7. NEW CONTRIBUTIONS TO ACADEMIC KNOWLEDGE

1. This study presents the first validation of the Hungarian and Portuguese versions of a tool to assess COM-HL in adults, which was developed and validated internationally. Meaning that our findings provide significant steps and a strong foundation for further research in the field.
2. Our nationwide research, which is representative of the general Hungarian adult population, found that the COM-HL of Hungarian adults is slightly higher than the European average.
3. As the first COM-HL study in Portuguese-speaking African countries, this research provides baseline data on COM-HL in Angola. Based on the results of Survey 2, Angolan adults have low COM-HL on average, suggesting a high prevalence of communication challenges in interactions between patients and physicians.
4. Consistently, the studies showed that the most difficult issue people face in health care settings is not having enough time with their doctor during consultations.
5. In the Hungarian survey, COM-HL was significantly higher in males, adults aged 66-75 years, individuals without financial deprivation, and those with strong social support.
6. Higher COM-HL was positively associated with daily physical activity and fruit and vegetable consumption, as well as with lower odds of health-related limitations based on the results of the Hungarian survey.
7. In the Angolan survey, COM-HL was positively associated with living in urban areas, lack of financial deprivation, being in good health, and being retired or engaged in domestic tasks.

8. SUMMARY

Although scholarly attention to COM-HL has increased in recent years, research has predominantly focused on high-income countries. Existing evidence shows that COM-HL is strongly associated with health outcomes. Enhancing COM-HL is therefore essential for improving healthcare services, as it enables individuals to understand health information and actively participate in decisions regarding their health and well-being.

The aims were to examine COM-HL in the general adult population, identify levels and determinants of COM-HL in both the Hungarian and Angolan contexts.

The first survey validated the Hungarian version of the HLS19-COM-P tool. The mean score of COM-HL was 86.8. Explaining health concerns to a physician was identified as the easiest task, whereas insufficient consultation time was the most challenging. Women had lower COM-HL scores than men, while participants aged 66–75 years scored higher than those aged 18–29 years. Higher COM-HL levels were also associated with stronger social support and the absence of financial hardship, as well as with daily physical activity, fruit and vegetable consumption, and lower odds of health-related limitations. The second survey emphasized the novelty of the Angolan context and validated the Portuguese version of the HLS19-COM-P instrument, which showed good internal consistency. The mean score of COM-HL was 49.9. The lowest scores were observed among individuals aged 70 years and above, those reporting poor health status, and rural residents. Insufficient consultation time was again identified as the most challenging task, while recalling information received from physicians was the easiest. COM-HL was positively associated with urban residence, better perceived health status, and lower financial deprivation.

The findings reveal persistent communicative challenges faced by individuals in health care settings, particularly limited consultation time with their doctor. Also, it highlights the significant influence of social and economic factors on COM-HL. These results may assist policymakers and healthcare decision-makers in identifying communicative barriers and developing targeted interventions to strengthen patient–physician interaction and improve healthcare quality.

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9.2 Publications related to the dissertation



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PhD Publication List

Candidate: Frederico Epalanga Albano Israel
Doctoral School: Doctoral School of Health Sciences

List of publications related to the dissertation

1. **Israel, F. E. A.**, Vincze, F., Ádány, R., Bíró, É.: Communicative health literacy with physicians in healthcare services: results of a Hungarian nationwide survey.
BMC Public Health. 25 (1), 1-10, 2025.
DOI: <http://dx.doi.org/10.1186/s12889-025-21590-1>
IF: 3.6 (2024)
2. Vincze, F., **Israel, F. E. A.**, Ádány, R., Bíró, É.: The independent and moderator role of communicative health literacy on health, health behaviour and health care utilisation: a population based cross-sectional study.
Public Health. 245, 1-7, 2025.
DOI: <http://dx.doi.org/10.1016/j.puhe.2025.105794>
IF: 3.2 (2024)





List of other publications

3. Soares, A. C. A., Lovas, S., Mahrouseh, N., Chamouni, G., Shahin, B., Mustafa, E. O. A., Muhlis, A. N. A., Njuguna, D. W., **Israel, F. E. A.**, Gammoh, N., Chandrika, N., Atuhaire, N. C., Ashkar, I., Chatterjee, A., Charles, R., Alzuhaily, H., Almusfy, A., Díaz Benavides, D., Alshakhshir, F. K., Varga, O.: Primary Prevention of Type 2 Diabetes Mellitus in the European Union: a Systematic Review of Interventional Studies. *Nutrients*. 17 (6), 1-28, 2025.
DOI: <http://dx.doi.org/10.3390/nu17061053>
IF: 5 (2024)

Total IF of journals (all publications): 11,8

Total IF of journals (publications related to the dissertation): 6,8

The Candidate's publication data submitted to the Tudóstér have been validated by DEENK on the basis of the Journal Citation Report (Impact Factor) database.

10 September, 2025



10. KEYWORDS

communicative health literacy, measurement properties, questionnaire-based survey, patient-physician interaction, European Health Literacy Population Survey 2019–2021, Hungary, Angola

11. ACKNOWLEDGEMENT

First and foremost, I would like to express my sincere gratitude to my kind supervisor, Dr. Bíró Éva, for her unwavering support and guidance throughout my Ph.D. journey. I am especially thankful that she never gave up on me, even after my beloved daughter was diagnosed with a terminal illness, which made my academic journey extremely challenging, to say the least. My Dear supervisor, you supported and stood by me all the way. I am also profoundly grateful to Dr. Vincze Ferenc for his special support, as well as to the other co-authors for their valuable contributions. I gratefully acknowledge the use of the HLS19 instrument, which was developed within the framework of “HLS19 – the International Health Literacy Population Survey 2019–2021” by M-POHL.

I want to extend my heartfelt appreciation to my parents and siblings for their unwavering love and belief in my abilities, which have been my pillars of strength. Their continuous support allowed me to fully immerse myself in my studies. Every achievement of mine is a testament to their dedication and sacrifices. I am also profoundly grateful to my wife’s family for their support and kindness. I am especially grateful for my loving wife’s unwavering support, patience, encouragement, and sacrifices for my academic pursuits. I extend my heartfelt gratitude to my beloved daughter, whose presence—and later departure—reminds me daily of the joy that exists beyond the world of academia and inspires me to achieve my fullest potential.

Finally, I would like to acknowledge the support from the Tempus Public Foundation, the University of Debrecen, and everyone involved indirectly who significantly facilitated my study and research endeavours.

With profound gratitude,

Frederico Epalanga Albano Israel

12. FUNDINGS

The work was supported by the Ministry of Human Capacities, Hungary (IV/956 4/2020/EKF) and the University of Debrecen through the Stipendium Hungaricum Scholarship.

13. APPENDIX