

# Health Literacy Cross-Sectional National Survey in Cameroon General Population

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## To cite this article:

Gustave Soh, André Wamba. Health Literacy Cross-Sectional National Survey in Cameroon General Population. *Central African Journal of Public Health*. Vol. 8, No. 3, 2022, pp. 121-133. doi: 10.11648/j.cajph.20220803.16

Received: May 22, 2022; Accepted: June 9, 2022; Published: June 30, 2022

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**Abstract:** *Background:* Health literacy (HL) is the ability of an individual to obtain and translate knowledge and information in order to maintain and improve health in a way which is appropriate to that individual and system contexts. It has become a priority for health in the 21<sup>st</sup> century, and many countries have included HL as a key priority in their policies and practices. However, in many African countries, such as Cameroon, information about the status of HL among population remains scarce. *Objective:* This study sought to describe the HL level of the Cameroonian population and its determinants. *Methods:* A cross-sectional national survey using the European Health Literacy Survey Questionnaire short forms (HLS-EU-Q16) was conducted. Both English and French version of HLSEU16 were used due to the fact that the country is bilingual. 1,226 persons (50.5% females, ages 15-96 years, mean age 27.99 years, standard deviation 9.73) completed an online (47%) and paper (53%) questionnaire. *Results:* At least one quarter (1/4) of respondents (24.6%) showed insufficient HL and 74.3%, almost three quarter (3/4) had limited (insufficient and problematic) HL. Sufficient HL was predominant in all subcategories of the population. Subgroups within the population with low HL were those with more than two chronic diseases ( $F(3; 1,222) = 4.673, p = .003$ ) and those living in rural areas ( $F(2; 1,223) = 21.870, p < .001$ ). Participants with high HL evaluated their health as very good ( $F(3; 1,222) = 24.586, p < .001$ ) and were satisfied with their life ( $F(3; 1,222) = 15.317, p < .001$ ). *Discussion and conclusion:* Limited HL represents an important challenge for health policies and practices across Cameroon like in many European countries. The influence of socio-cultural aspect in HL must be taken into account when developing HL tools to ensure quality measurement and to improve health equity around the world.

**Keywords:** Health Literacy, Survey, Cameroon, HLS-EU-Q16

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## 1. Introduction

Health literacy (HL) is “the ability of an individual to obtain and translate knowledge and information in order to maintain and improve health in a way which is appropriate to that individual and system contexts” [1]. It has “become a priority for health in the 21<sup>st</sup> century” [2] and the best predictor of an individual health [3]. Therefore, many countries and organizations around the world have included HL as a key priority in their policies and practices [4-7]. Specifically, HL has recently gained importance on the European health agenda [8, 9].

Despite the growing attention on the concept of HL among

European health policy-makers, researchers and practitioners; information about the status of HL in Europe and globally were still scarce in 2015 [9]. The situation is even worse in most developing countries where very little has been done and documented on HL despite the importance of health information, which partly forms HL and the fact that health information being listed among priorities under most of these countries’ National Health Research Priorities [8]. In many African countries such as Cameroon, information about the status of HL among population remains scarce. While several studies have demonstrated the prevalence of limited health literacy across the world [6, 9], population data on HL levels in Cameroon remains unexplored. To address this shortcoming, this study aims to describe General Health

Literacy (GHL) level among Cameroonians and brings out the factors associated with, in other to provide information to those in charge of population health and Cameroon health policy-makers. This can create awareness about HL and about what it is.

## 2. The What, Why, and How of HL

### 2.1. What Is HL

Health literacy can be looked in various ways, in various contexts and applied differently [10]. This makes the concept relative. There exist different definitions of HL [1, 10-16]. A systematic literature review and critical analysis to determine the extent to which definitions of HL differ in the academic literature, the similarities and differences across definitions, and possible interpretations for the most commonly used definitions identified 250 different definitions [10]. Despite this variety of definitions, it is worth noted firstly that research on HL regarded it as a one-dimensional concept, which primarily focused on reading ability or functional health literacy. However, with the evolution of the HL field, it has become clear that HL encompasses multiple dimensions, and that it is a rather complex and heterogeneous construct [2].

Health literacy was first proposed in 1974 by Simonds in the United States with regards to health education in schools. It is now being used internationally, not only in health care, but also within the public health context [6, 17]. According to Sørensen, the first clear definition is from 1995 [2]. HL is stated as the capacity of individuals to obtain, interpret, and understand basic health information and services and the competence to use such information and services in ways which enhance health. Three years after, the term HL was introduced to the World Health Organization (WHO) glossary and defined as the cognitive and social skills which determine the motivation and ability of individuals to gain access to understand and use information in ways which promote and maintain good health [18].

The first complete definition of HL which consider most of the aspect of HL was proposed by the European Health Literacy Project (HLS-EU) in 2012 [15]. From a systematic literature review of existing HL definitions and models, a complete definition of the concept of HL is proposed as follow: "Health literacy is linked to literacy and entails the motivation, knowledges and competencies 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 throughout the course of life" [15]. Based on this definition, Sørensen et al. [15] developed a conceptual framework outlining the main dimensions of HL as mentioned in the literature, and integrating them in a logical model identifying the proximal and distal factors that may impact on HL, as well as potential consequences of HL in terms of health related behaviors, health outcomes and health service use [15, 19].

### 2.2. Why Is It Important to Know About HL Skills of Populations

It is important to know about HL of a population because the society in which we live in today contains much more information, and it is not surprising that many people do not have the skills to be health literate in all situations due to impediments by an almost endless list of barriers, circumstances and information processing demands [8]. According to the result of first comparative European HL survey, HL is influenced by personal, situational and societal determinants and has, in turn, an impact on healthcare use and costs, health behaviour and status, participation and empowerment as well as sustainability and equity [15]. Therefore, mastery and developing HL among people has become very important to practitioners, educators, policy makers, and an individual to promote health. Furthermore, Zarcadoolas et al. [16] highlight that: "A health-literate person is able to apply health concepts and information to novel situations, and to participate in ongoing public and private dialogues about health, medicine, scientific knowledge and cultural beliefs, hence defining health literacy as 'the wide range of skills and competencies that people develop to seek out, comprehend, evaluate, and use health information and concepts to make informed choices, reduce health risks, and increase quality of life'" [16].

To continue with the reflexion of Zarcadoolas et al., Muhanga and Malungo identify six competences that a health-literate person ideally supposes to have [8, 16]. To them, a health-literate individual is able to seek and assess the health information required to: (i) understand and carry out instructions for self-care, including the administering of complex daily medical regimens, (ii) plan and achieve the lifestyle adjustments required for improved health, (iii) make informed positive health-related decisions, (iv) know how and when to access health care, (v) share health promoting activities with others, and, (vi) address health issues in the community and society [8].

It is also important to know the HL level of the population because several initiatives and studies have raised awareness of the importance of HL to health, increased uptake of healthy behaviors and health care and have drawn attention to the need for measures of HL based on evidence that there is a relationship between HL and health outcomes [1, 3, 8, 12, 15, 20-25]. In this sense, studies have shown that individual HL is linked to social health inequity [17]; that low individual HL level is associated with poor health outcomes and low health care utilization [21, 26]. In this light, low HL have a negative impact on health and quality of life. In their study, Ehmann et al. demonstrated moderate correlations between HL and quality of life and subjective health status [27]. Apart from having a negative impact on health and quality of life, low HL level is associated to financial toll. In 2009 in Canada, low HL level cost around 3 to 5% of the total health care budget for that year [28]. Low HL level is also associated with a variety of adverse health outcomes, including increased mortality, hospitalization [29], and in

some cases poorer control of chronic health conditions [20].

Bröder et al. discuss children's and young people's HL by elaborating and exploring childhood and youth as life phases with unique characteristics [30]. The unique particularities of children and young people relevant for HL include their disease and health-risk profiles, their vulnerability to demographic factors, their social role and status, and their right to participate actively in their own health. Bröder et al. perspective have to be taken more into consideration in Africa and particularly in Cameroon's context where this category represents 42.5% of the total population [30]. In Africa, many studies also established the link between HL and health [31, 32]. Although in Sub-Saharan Africa particularly, service coverage and health outcomes vary hugely between and within many countries [31], it was observed that limited HL is associated with self-esteem, health status, year of study and living in urban area [31-33].

Due to the significant benefits of HL to individual and public health, and the sustainability of healthcare systems, increasing attention has been attached to this concept over the past two decades and HL seems to be presenting separately by researchers as a multidimensional [16, 24], complex [34, 35] or heterogeneous concept [36, 37]. HL is also presented as a concept that is both multidimensional, complex and heterogeneous [2]. Understanding HL as multidimensional, researchers will be able to investigate the array of contributing factors that may further explain the link between literacy and health [2].

### 2.3. How Is HL Conceptualised

In the last two decades the conceptual approach of HL has moved beyond an individual approach to an approach considering HL embedded in a societal context, it has influence the relationship and interaction between individuals and the societal services to maintain and improve health [38]. Moreover, today HL skills required by individuals to interact effectively with health services depends on the complexity of those services, and the demands they place on people [25]. Therefore, most interest is now according to the development of the organisational health literacy responsiveness [23, 25]. However, in this study, we focused only on individual HL framework.

Nutbeam present a conceptual model of HL as a key outcome from health education [24]. For him, HL is a composite term to describe a range of outcomes to health education and communication activities. In this perspective, three dimensions are distinguished: functional literacy, which involves basic skills (reading, writing, etc.) to access health information; interactive literacy, which refers to more advanced cognitive skills to understand this information; and critical literacy, which involves in-depth cognitive and social skills that ultimately lead to better control of life events [39]. HL being an involving concept, is conceptualised as a risk factor and as asset [39]. As a risk model, HL is a distinct concept, an outcome to health and patient education. In the risk model HL is a "prior status" derived from existing literacy and numeracy. In the asset model, health education is

directed towards enabling individuals to exert greater control over a broad range of factors that determine health [39]. As both perspectives are important and useful to enable a better understanding of health communication processes in clinical and community settings, any definition of HL needs to integrate both views [15].

The European Health Literacy Consortium in 2012, developed an integrated conceptual model of HL based on a systematic review of existing definitions and conceptualizations of HL [2]. This integrated model combines the qualities of a conceptual model outlining the most comprehensive dimensions of HL, and of a logical model, showing the proximal and distal factors, which impact on HL as well as the pathways linking HL to health outcomes [15]. This integrated conceptual model as the conceptual model of Nutbeam [24], also bridge the gap between the individual and the societal approach, which was found by Freedman et al. [40]. The latter authors argued that a distinction must be made between public and individual HL.

According to the authors of the integrated conceptual model of HL, the core of the model shows the competencies related to the process of accessing, understanding, appraising and applying health-related information [15]. Also, according to the 'all inclusive' definition this process requires four types of competencies: (1) Access refers to the ability to seek, find and obtain health information; (2) Understand refers to the ability to comprehend the health information that is accessed; (3) Appraise describes the ability to interpret, filter, judge and evaluate the health information that has been accessed; and (4) Apply refers to the ability to communicate and use the information to make a decision to maintain and improve health. The model can serve as a basis for developing HL enhancing interventions and provide a conceptual basis for the development and validation of measurement tools, capturing the different dimensions of HL within the healthcare, disease prevention and health promotion settings.

Based on this conceptual approach, the European Health Literacy Survey Questionnaire (HLS-EU-Q) was developed to measure HL among European population. This model integrates four health information processing skills (accessing, understanding, appraising, and applying health information) applied in three health contexts (healthcare, disease prevention, and health promotion). This tool is used in this study to access HL levels in Cameroonians since no tool used in measuring HL has been elaborated in a country in sub-Saharan Africa [22]. In Cameroon, there are currently no studies evaluating the HL levels among general population or any other social groups. But, recently, one research based on the definition of health literacy from the United State Institute of Medicine (IOM) accessed data from surveys conducted between 2006 and 2015 in 14 sub-Saharan African countries<sup>1</sup> including Cameroon [41]. The lack of

<sup>1</sup> Those 14 countries are Cameroon, Democratic Republic of Congo, Ethiopia, Ghana, Guinea, Côte d'Ivoire, Lesotho, Rwanda, Niger, Namibia, Sierra Leone, Swaziland, Togo, and Zambia.

research in this area makes regional and global comparisons as well as policy decisions difficult. This study, therefore, sought to answer the research question, “What is the level of comprehensive HL and what factors are associated with limited HL among general population?”

### 3. Methods

#### 3.1. Study Design, Participants and Data Collection

The study was a cross-sectional national survey. The data were collected from August to December 2020 in Cameroon. Cameroonian aged 15 and above were concerned by the questionnaire. Cameroonian living abroad were excluded from the study as well as those under 15 years. A total of 1,226 participants whose ages ranged between 15 and 96, recruited using the convenience sampling technique, volunteered to take part in this study (620 males; Mean age = 27.99, Standard Deviation age = 9.73). All participants were interviewed randomly either in the street, in their home, in school milieu or online. The study was conducted via two ways: (1) face-to-face participants filled the questionnaire in paper version (n = 650) and (2) online version (n = 576). According to Hohwü et al., this last filling mode (Web-based questionnaires) could replace traditional paper questionnaires with minor effects on response rates and lower costs [42]. Also, since our tool was bilingual, 82.2% of participants answered the French version while 17.8% answered the English version. Participants were invited to be open and honest in their responding.

Participants came from the 10 regions of Cameroon. Four regions had more than 10% of total sample which stem from: West (33.1%), Far North (18.6%), North (12.8%) and Centre (11.5%). On the other hand, three regions had less than 3% of the sample: East (1.1%), Adamaoua (1.2%) and South-West (2.9%). At least ½ (48.4%) participant live in regional head quarter, 27.9% in divisional head quarter while 23.7% live in rural areas. Our participants therefore were mostly living in urban areas (76.3%).

#### 3.2. Instruments

The final tool consisted of 34 items divided into the following categories: health literacy based on the short European Health Literacy questionnaire (HLS-EU-Q16), Satisfaction with Life Scale (SWLS) [43], and sociodemographic indicators.

We used HLS-EU-Q16 to assess GHL of population [44]. This tool was previously validated in Cameroon context [45]. The core of the model of this questionnaire was conceived of a 12 cells matrix positing the key processes of accessing, understanding appraising and applying health related information within three domains: healthcare, disease prevention and health promotion [15]. The 16 items reflecting perceived easy or difficulty in an individual's ability to access/obtain health information, understand health information (not only in written form), process/appraise health information, and apply/use health information.

Response options include “very easy,” “easy,” “difficult,” and “very difficult.” Our tool was bilingual, using both English and French version of HLS-EU-Q16 due to the fact that Cameroon is a bilingual country with 20% Anglophone's (02 regions over 10) and 80% Francophone's (8 regions over 10). Cronbach's alpha coefficient of reliability for the 16 items of HLS-EU-Q was high. Cronbach's alpha of .830 was obtained for English version and .848 for French version. Also, two possibilities existed to fill HLS-EU-Q16: paper and online copies. Cronbach's alpha coefficient for paper copy was .723 while for online copy was .886. The global and final Cronbach's alpha coefficient of the 16 items for this study was high .847 compared to .81 and .83 for the HLSEU-Q-16 and the HLS-EU-Q-6, respectively for the original questionnaire [44]. Nonetheless, it was low compared to .928 obtained in Israel [46] and to .982 obtained in Spain [47].

The standardized index score was used to calculate the total score (Index = (average - 1)\*(50/3)); with the index score ranges from 0 to 50 [9]. As the score on the scale increases, the HL level increases. Four levels of HL were originally constructed: inadequate HL (0–25), problematic HL (>25–33), sufficient HL (>33–42) and excellent HL (>42–50). But, to detect vulnerable groups, the inadequate and problematic levels were combined to a single level, called limited HL (0–33) in previous studies [9, 44]. These three categories are used in this study to make result comparable.

HLS-EU-Q16 was chosen for this work because the HLS-EU-Q methodology has been used in the investigations of numerous other countries of the European Region of the World Health Organisation (WHO), or even beyond the region [48]. Notably, it was used in Ghana [49], in Germany [27], in Belgium [26], in Israel [46] with satisfactory results. It is also because of the absence of a tool more appropriated for the sub-Saharan African context. Until 2018, no tool of measure of the HL has been elaborated in any sub-Saharan Africa country [22]. Overall of this, the main reason is the exiting of the valid French version [44]. Moreover, as the short versions of the HLS-EU-Q are increasingly used to measure and compare GHL in populations within Europe and worldwide, this will facilitate the comparison of our results. Furthermore, since the HLS-EU-Q aim to measure GHL, this meet the objective of this study which is to evaluate the GHL among Cameroon population.

The satisfaction with life was also measured using SWLS [43]. The SWLS was developed to assess satisfaction with the respondent's life. The scale does not assess satisfaction with life domains such as health or finances but allows subjects to integrate and weight these domains in whatever way they choose [50]. Participants were giving five statements that they might agree or disagree with, using the 1-7 scale by indicate his agreement with each item. This help to evaluation relationship between HL and the satisfaction of life which have not yet been explored by many researchers [51]. The Cronbach's alpha coefficient of SWLS was acceptable .711.

Personal factors were gender, age, chronic illness,

employment status and speaking mother tongue or any national language. Education was measured by number of years of formal education (highest diploma). Social factors were region of origin, living region, and place of residence and consultation of a traditional doctor in case of illness. These variables were selected because studies showed that HL is determined by individual and environmental factors [9, 15, 52-54]. Self-rated health status was measured by asking participants to rate the state of their health on a four-point scale as either very good, good, poor and very poor. This approach has been used successfully across several contexts to measure health status by using five-point scale [51, 52].

### 3.3. Ethical Considerations

Before administering the questionnaire, participants were informed that the data they provided will be kept confidential and used only for research purposes in accordance with the provisions of article 5 of law n ° 91/023 of December 16, 1991 on statistical surveys and censuses in Cameroon. They were also informed that their participation was voluntary and free of charge. In addition, they were assured that any participant who had started completing the questionnaire could withdraw at any time if they wished without having to justify themselves.

The procedure for obtaining informed consent was more or less different for the questionnaires administered online and the questionnaires administered face-to-face. In the latter mode, informed consent was primarily obtained verbally and by answering an item on the questionnaire: "I agree to complete this questionnaire because I understand the advantages, risks and disadvantages of my participation in the study. After reflection, I freely consent to participate. Participants had three response options: 1. Yes, I have had enough information and agree to participate; 2. No, I did not have enough information, I am not participating; or 3. I did not have enough information, but I agree to participate freely. Only participants who chose options 1 & 3 were included in the analyses.

Concerning adolescents under 18 who completed the questionnaire on paper or online, they obtained prior consent from their parents or representatives. Thus, the following item – to which they had to answer yes or no – was added to the preamble: "If I am under 18, I certify that I have completed this questionnaire with the consent of one of my parents or guardians". All minors who answered in the negative were excluded from the final database.

### 3.4. Data Analysis

The analyses comprised of descriptive univariate analysis and bivariate analysis using the IBM SPSS Statistics® V23 software package. The univariate analysis examined the

frequencies and differences between different sociodemographic factors. Bivariate analysis using t-tests and variance analysis were performed to examine the relationship between HL and sociodemographic variables. The descriptive analysis also included a correlation analysis between SWLS and HL. Finally, the binary multiple regression model was performed to identify HL determinants among sample. The significance level for all associations was set at  $p < .05$ . All missing values in the data were replaced by the mean for three variables: age, SWLS and HLS-EU-Q16. Specifically, for HSL-EU-Q16, all participants having more than two missing values were removed from the sample. This process has been used in previous studies [27, 31, 51].

On the other hand, self-rated health status was measured by asking participants to rate the state of their health on a four-point scale. These data crossing with the results to the scale of HLS-EU-Q16. Result of the study is presented in two parts. The result of t-test of student between sociodemographic variables with two modalities and HL (Table 2) and the result of analysis of variance between sociodemographic variables with more than two modalities and HL (Table 3). Finally, for logistic regression analyses, the HLS-EU-Q16 index was dichotomized into limited (inadequate and problematic) and excellent (sufficient and excellent) HL.

## 4. Results

### 4.1. General Health Literacy in Cameroon

The average index score of health literacy in Cameroon was 30.28 (Standard Deviation = 7.39) out of a potential of 50 points. In our sample (Figure 1), at least 4 out of 10 participants (24.6%) had inadequate HL, 49.7% had problematic HL, 20.3% sufficient HL while 5.5% had excellent HL. However, the differences between different regions are important. On the one hand, only 7.7% of participant of East region and 24.5% of South region had inadequate HL. On the other hand, East region had no participant with excellent HL while 9.6% of participant of the North-West had excellent HL.

To detect vulnerable category, Sørensen et al. and Rouquette et al. recommended the combination of the inadequate and problematic levels to a single level, called limited HL to make comparison easy worldwide [9, 44]. The distribution of these three levels according to this study can be seen from table 1 below. Results showed that almost 3/4 (74.3%) respondent in the total sample had limited HL, with the prevalence ranging from 46.2% in the East region to more than 85.4% in North region (Figure 1). Meanwhile, 20.3% had sufficient HL, and only 5.4% showed likely excellent HL.

Table 1. Distribution of the three levels of health literacy among Cameroonian.

Levels of Health Literacy (n = 1,226)	N	%	IC 95%Interval
Limited health literacy (Index score values 0–33)	911	74.3	26.79 – 27.43
Sufficient health literacy (Index score values 34–42)	249	20.3	37.05–37.67
Excellent health literacy (Index score values 43–50)	66	5.4	46.61 – 47.62

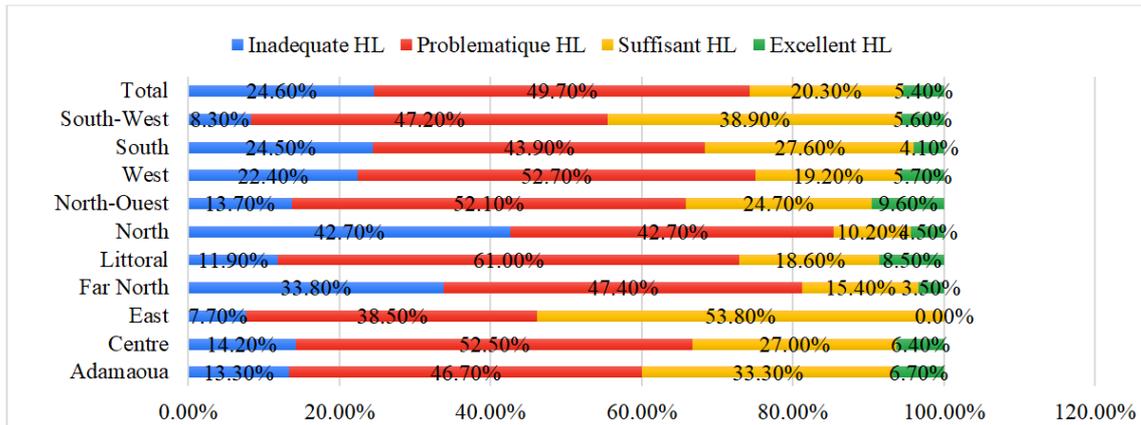


Figure 1. Levels of GHL index for the total sample and by region of origin.

4.2. Health Literacy and Satisfaction with Life

The mean score for satisfaction with life among limited HL was 3.66, for sufficient HL 4.17, and for excellent HL participants 4.38. Univariate analyses showed that HL was significantly associated with life satisfaction ( $F(2, 1,223) = 38.5, p < .001, \text{partial } \eta^2 = .059$ ). The conclusion is that, more the HL level increases, more people have satisfaction with life.

After compared different groups of HL according to their life satisfaction, we calculated the correlation and regression for these two variables. First, for knowing if there is a link between the two and second, to know if HL can predict the life satisfaction. Result indicated that there is link between HL and satisfaction for life ( $r(1,226) = .291, p < .001$ ). This

link is the first step before analysis of the regression that with permit to examine which variable predict order. More specifically, concerning the good satisfaction with life, the analysis of the regression indicates a positive effect and significant of HL ( $\beta = 2.58; t(1,226) = 22.028, p < .001$ ). This result showed that people that can apply health concepts and information to novel situations, and to participate in ongoing public and private dialogues about health, medicine, scientific knowledge and cultural beliefs mostly estimated having life satisfaction.

4.3. Socio-demographic Variables and HL Among Cameroonian

The Table 2 presented result of t-test of student between sociodemographic variables with two modalities and HL.

Table 2. T-test of student between some sociodemographic variables and HL.

	Total sample (n = 1,226) n(%)	Limited HL (n = 911) n(%)	Sufficient HL (n = 249) n(%)	Excellent HL (n = 66) n(%)	HL index M(SD)	p-value
Gender						.484
Male	620 (50.6)	460 (50.5)	130 (52.2)	30 (45.5)	30.13 (7.37)	
Female	606 (49.4)	451 (49.5)	119 (47.8)	36 (54.5)	30.43 (7.40)	
Speak national tongue						.290
Yes	1074 (82.2)	809 (88.8)	204 (85.9)	61 (92.4)	30.19 (1074)	
No	150 (17.8)	102 (11.2)	45 (18.1)	5 (7.6)	30.87 (150)	
Consultation of traditional doctor						.376
Yes	460 (37.5)	351 (38.5)	85 (34.1)	24 (36.4)	30.04 (7.11)	
No	766 (62.5)	560 (61.5)	164 (65.9)	42 (63.6)	30.42 (7.55)	
Fill copy						.000
Online copy	576 (47)	374 (41.1)	154 (61.8)	48 (72.2)	32.61 (676)	
Paper copy	650 (53)	537 (58.9)	95 (38.2)	18 (27.3)	28.21 (650)	
Language						.000
English	218 (17.8)	146 (16)	54 (21.7)	18 (27.3)	32.20 (7.08)	
French	1008 (82.2)	765 (84)	195 (78.3)	48 (72.7)	29.86 (7.39)	

Results indicated that, (Table 2) there was no statistically significant difference between the mean health literacy index score of female and male study participants ( $p = .484$ ). There was also no significant difference in the index mean HL score between speakers of at least one national language and non-speakers of national language ( $p = .290$ ). Furthermore, there was no significant difference between the mean values in HL of participants who has ever consulted a traditional

doctor (or Healer, Talisman, Marabou, Sorcerer, Soothsayer, etc.) for personal health problem or for someone else and participants who has never consulted a traditional doctor for personal health problem; non-employed study participants ( $p = .376$ ). In the opposite, a statistical significant difference in the mean HL index score between participants who filled paper version and those who filled online version ( $t(1,224) = 10.912, p < .001$ ). Also, language is associated with HL.

English speaking participants have better HL than French. There is statistical significant difference between their HL mean score ( $t(1,224) = -4.256, p < .001$ ).

As illustrated below, (Table 3) they was a statistic significant relationship between the place of residence, age, duration in formal education (higher diploma), chronic diseases, social status and HL knowledge. Specifically, from the data, analysis indicated a statistical significant difference in the mean HL index score between participants living urban areas and those living in semi-urban and rural areas ( $F(2; 1,223) = 21.870, p < .001$ ). Living in urban areas has benefits in developing HL skills and knowledge than semi-urban and rural areas. Also, it was observed that age is associated with

HL in this survey ( $F(4; 1,221) = 6.106, p < .001$ ). Indeed, in our survey, HL knowledge increases with age. But, from 55 years, a drastic fall in HL knowledge is noticed. People aged 55 and above are more likely to have poor health skills than younger persons. Furthermore, formal education is associated to HL ( $F(5; 1,220) = 24.206, p < .001$ ). The average HL of participants who have no diploma or who have only completed primary education is 28.57 (SD = 8.72) while 34.07 (SD = 8.64) was for Doctorate/Ph.D. degree holders. Globally, to the exception of the secondary level participants of the first cycle who have the weakest performance in HL, from primary/no diploma to Doctorate/Ph.D., the HL knowledge increases with the level of education.

**Table 3.** Analysis of variance between some sociodemographic variables and HL.

Independent variable	Total sample (n = 1,226) n(%)	Limited HL (n = 911) n(%)	Sufficient (n = 249) HL n(%)	Excellent HL (n = 66) n(%)	HL index M(SD)	p-value
Place of residence						< .001
Urban	593 (48.4)	409 (44.9)	136 (54.6)	48 (72.7)	31.68 (7.28)	
Semi-Urban	342 (27.9)	268 (29.4)	63 (25.3)	11 (16.7)	29.18 (7.31)	
Rural	291 (23.7)	234 (25.7)	50 (20.1)	7 (10.6)	28.70 (7.17)	
Age (year)						< .001
15-24	501 (40.9)	387 (42.5)	92 (36.9)	22 (33.3)	29.53 (7.38)	
25-34	516 (42.1)	381 (41.8)	109 (43.8)	26 (39.4)	30.41 (7.14)	
35-44	134 (10.9)	92 (10.1)	33 (13.3)	9 (13.6)	31.98 (6.64)	
45-54	44 (3.6)	27 (3)	9 (3.6)	8 (12.1)	33.61 (9.36)	
< 55	31 (2.5)	24 (2.6)	6 (2.4)	1 (1.5)	28.12 (9.00)	
Formal education level						< .001
Primary or none	85 (6.9)	67 (7.4)	11 (4.4)	7 (10.6)	28.57 (8.72)	
Secondary first cycle	388 (31.6)	318 (34.9)	66 (26.5)	4 (6.1)	27.89 (7.04)	
Secondary second cycle	221 (18.0)	178 (19.5)	35 (14.1)	8 (12.1)	29.26 (7.38)	
Degree	228 (18.6)	154 (16.9)	57 (22.9)	17 (25.8)	32.09 (6.54)	
Master Degree	262 (21.4)	172 (18.9)	68 (27.3)	22 (33.3)	33.04 (6.34)	
Doctorate/Ph.D.	42 (3.4)	22 (2.4)	12 (4.8)	8 (12.1)	34.07 (8.64)	
Chronic Disease						.003
None	997 (81.3)	730 (80.1)	214 (85.9)	53 (80.3)	30.53 (7.24)	
One	175 (14.3)	133 (14.6)	32 (12.9)	10 (15.2)	29.90 (7.88)	
Two	26 (2.1)	23 (2.5)	1 (0.4)	2 (3)	27.28 (8.51)	
More than two	28 (2.3)	25 (2.7)	2 (0.8)	1 (1.5)	26.33 (6.73)	
Health status						< .001
Very good	185 (15.1)	106 (11.6)	59 (23.7)	20 (30.3)	32.82 (7.88)	
Good	884 (72.1)	662 (72.7)	180 (72.3)	42 (63.6)	30.45 (7.09)	
Poor	146 (11.9)	132 (14.5)	10 (4)	4 (6.1)	26.51 (6.93)	
Very Bad	11 (0.9)	11 (1.2)	0 (0)	0 (0)	23.39 (5.00)	
Social Status						< .001
Currently student	768 (62.6)	592 (65)	148 (59.4)	28 (42.4)	29.37 (7.36)	
Currently employed	391 (31.9)	268 (29.4)	89 (35.7)	34 (51.5)	32.21 (6.92)	
Currently not employed	52 (4.2)	38 (4.2)	10 (4)	4 (6.1)	30.04 (8.01)	
Currently retired	15 (1.2)	13 (1.4)	2 (0.8)	0 (0)	27.01 (8.93)	

Another results of this study shows that participant with high HL evaluate their health as very good ( $F(3; 1,222) = 24.586, p < .001$ ) and are satisfied with their life ( $F(3; 1,222) = 15.317, p < .001$ ). Chronic diseases were also crossed with HL. The highest mean score value was obtained by the group of no chronic disease (M = 30.53, SD = 7.24). Contrarily, group with more than two chronic diseases obtained lest mean score value (M = 26.33, SD = 7.63). On the whole, a meaningful effect is observed between chronic diseases and HL ( $F(3; 1,222) = 4.673, p = .003$ ). The last variable explored in the survey is social status. This is also positively linked to HL knowledge ( $F(4; 1,221) = 20.806, p < .001$ ).

Those who are currently employed have the best HL mean index (M = 32.21; SD = 6.92) while those currently retired have de poorest performance (M = 27.01; SD = 8.93).

On studying the variables associated with HL levels using the binary multiple regression model as table 4 showed, it was observed that Satisfaction with life ( $\beta = .552$ ; Wald = 48.058;  $p < .001$ ); the type of questionnaire filled ( $\beta = .642$ ; Wald = 3.996;  $p = .046$ ); language spoken ( $\beta = -.670$ ; Wald = 6.219;  $p = .013$ ); social status ( $\beta = -.797$ ; Wald = 9.620;  $p = .002$ ); region of residence ( $\beta = 1.640$ ; Wald = 5.266;  $p = .022$ ) and health status ( $\beta = -.772$ ; Wald = 24.946;  $p = .001$ ) variables were associated with health literacy. The

OR = .512, indicated that participants having French as official language are 51% less likely to have excellent HL than those having English language. In addition, been

currently (OR = .451) or having more than two chronic diseases (OR = .462) is associated for poor risk having excellent HL.

**Table 4.** Variables associated with excellent health literacy using the binary multiple regression model.

	<i>B</i>	<i>E.S</i>	<i>Wald</i>	<i>Ddl</i>	<i>Sig.</i>	<i>OR</i>	<i>IC 95% OR</i>	
							<i>Lower</i>	<i>Upper</i>
Satisfaction with life	.552	.08	48.058	1	0	1.737	1.486	2.031
Fill copy (Online copy)	.642	.321	3.996	1	.046	1.9	1.013	3.564
Language (English)	-.67	.269	6.219	1	.013	.512	.302	.866
Social Status (Currently student)	-.797	.257	9.62	1	.002	.451	.272	.746
Living region (South)	1.64	.715	5.266	1	.022	5.156	1.27	20.93
Health status (Very Bad)	-.772	.155	24.946	1	0	.462	.341	.626
Constant	-3.959	1.426	7.705	1	.006	.019		

## 5. Discussion

This article is the first to address Cameroonian HL questions. Its objective was to describe the HL levels of Cameroonian population and its determinants. The results shows that the level of HL among our target population is lower compared to other nationwide studies using the same HLS-EU-Q16. In our sample, which consists mainly of youths (M = 27.99, SD = 9.73), 74.3% had Limited HL (HLS-EU-Q16 index score values 0-33/50). It means that three quarters (3/4) of participants don't have knowledge and competencies 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 the quality of their life throughout the course of life [15].

The HLS-EU project which is the first study in Europe to

provide population data on HL at the European Union level and to enable a comparison of HL levels between eight selected member states, revealed that about half of sample (47.6%) surveyed in Europe had limited HL [9]. This ranges from 28.7% in the Netherlands to more than 62.1% in Bulgaria [9]. While in 2018 in Belgium, 33.4% of people aged 15 and more had limited HL [55] and 78% of street youth in Ghana in the same year [49]. The lowest results in the given identify in the literature were obtained by the inhabitants of Egypt, where as many as 81% of the respondents had a limited level of health literacy [56]. The sample mainly struggled with health literacy items (Table 5) dealing with understand health warnings about behaviour such as smoking, low physical activity and drinking too much (28.5%); understand your doctor's or pharmacist's instruction on how to take a prescribed medicine (27.7%); understand why you need health screenings (26.6%) and understand advice on health from family members or friends (25.6%).

**Table 5.** Frequencies of HLS-EU-16 Items among the Sample (n = 1,226).

HLS-EU-Q16 Items	very easy	Easy	difficult	very difficult
<b>On a scale from very easy to very difficult, how easy would you say it is to:</b>	<b>n (%)</b>			
1 - ...find information on treatments of illnesses that concern you?	72 (5.9)	358 (29.2)	608 (49.6)	188 (15.3)
2 - ...find out where to get professional help when you are ill? (referral: doctor, pharmacist, psychologist, etc.)	86 (7.0)	337 (27.5)	608 (49.6)	195 (15.9)
3 - ...understand what your doctor says to you?	52 (4.2)	247 (20.1)	725 (59.1)	202 (16.5)
4 - ...understand your doctor's or pharmacist's instruction on how to take a prescribed medicine?	36 (2.9)	158 (12.9)	693 (56.5)	339 (27.7)
5 - ...judge when you may need to get a second opinion from another doctor?	119 (9.7)	505 (41.2)	477 (38.9)	125 (10.2)
6 - ...use information the doctor gives you to make decisions about your illness?	62 (5.1)	332 (27.1)	658 (53.7)	174 (14.2)
7 - ...follow instructions from your doctor or pharmacist?	43 (3.5)	235 (19.2)	679 (55.4)	269 (21.9)
8 - ...find information on how to manage mental health problems like stress or depression?	182 (14.8)	519 (42.3)	389 (31.7)	136 (11.1)
9 - ...understand health warnings about behaviour such as smoking, low physical activity and drinking too much?	111 (9.1)	215 (17.5)	550 (44.9)	350 (28.5)
10 - ...understand why you need health screenings? (Referral: Breast examination, blood sugar test, blood pressure)	73 (6.0)	181 (14.8)	646 (52.7)	326 (26.6)
11 - ...judge if the information on health risks in the media is reliable?(Referral: TV, internet or other media)	92 (7.5)	380 (31.0)	560 (45.7)	194 (15.8)
12 - ...decide how you can protect yourself from illness based on information in the media?(Referral: TV, radio, newspapers, internet or other media)	67 (5.5)	296 (24.1)	645 (52.6)	218 (17.8)
13 - ...find out about activities that are good for your mental well-being? (Referral: exercise, walking, etc.)	64 (5.2)	275 (22.4)	641 (52.3)	246 (20.1)
14 - ...understand advice on health from family members or friends?	37 (3.0)	213 (17.4)	662 (54.0)	314 (25.6)
15 - ...understand information in the media on how to get healthier?(Referral: TV, radio, internet, newspapers, magazines)	56 (4.6)	285 (23.2)	643 (52.4)	242 (19.7)
16 - ...judge which everyday behaviour is related to your health? (Referral: Eating and drinking habits, exercise, etc.)	115 (9.4)	314 (25.6)	553 (45.1)	244 (19.9)

In general, this study shows that three quarters of Cameroonians compared to one half of Europeans [9], one third Belgians [55] and one fifth Germans [27], don't have competencies to seek out, comprehend, evaluate, and use health information and concepts to make informed choices, reduce health risks, and increase quality of life [16]. Specifically, 74.3% of the sample had limited HL, 20.3% sufficient HL, and only 5.4% showed likely excellent HL. Comparing to other countries, the proportion of individual with excellent HL is lower. 69% of people aged of 15 and above have excellent HL in Israel [46], 66.6% in Belgium [55], 61.9% in rural Germany [27], 25.1% in Netherland and 9.1% in Spain [9]. Despite the fact the proportion of low HL is high in this study, the result make sense according the characteristic of our sample. First, the participants are too young (mean age = 27.99) in comparison with 55.8 years in Belgium [26] or 63.7 years in Germany [27]. According to Bröder et al., young people have unique characteristic in terms of realities, needs, assets and perspectives, and therefore should be considered a specific group regarding HL and its determinant [30]. This result contrast with existing research that has found youth have higher levels of cognitive function, which enables them to obtain and adopt knowledge from a greater variety of sources [61]. Second, the official language of the participant. The result indicated that French speaking seems to have limited HL level than English speaking. However, in this work, the French language speakers represent 82.2% of the sample. The high proportion of French language speakers may have drawn down the general level of HL of the sample. Moreover, in a study in Belgium, Vandenbosch et al. observed that the proportions of Dutch speakers compare to French speakers are higher within the excellent HL group compared to the insufficient and limited HL groups [26]. French would not be an appropriate language to develop high expertise in HL.

Thirdly, added to that, among similar population by age in Africa [49, 56], this proportion is reasonable. However, it has been explained differently. In Ghana, according to Amoah et al. [49] the situation was caused by the poor economic situation of the state, limited educational opportunities among the Ghanaian community, and a patriarchal social structure whereas in Egypt, the largest factor shaping health literacy is functional fitness and level of education [56]. Globally, finding the reasons for the disproportion in health literacy levels, the research results from European and non-European countries include better grounding of projects on the development and acquisition of health competences in Europe than in other parts of the world [57].

In addition to this result, the research examined the correlation between HL and sociodemographic variables. That researchers did not find any significant associations between HL and gender, notional speaking language and the consultation of a traditional doctor for personal health or for other persons. This none significant relationship between gender and HL is usually observed [27, 46]. In some studies, gender was positively linked to HL after standardisation of

age [55] and was also found in some sub-Saharan Africa countries [41] such as Ghana [32] and Nigeria [58]. However, in another study in Beijing, Chinese women were 1.14 times more likely to have adequate HL than men [54]. Shi et al. results are in line with those of the European HL survey in Europe which indicated that men tend to have slightly lower HL [9, 54]. In the case of the present study, this can be explained by the fact that both men and women have approximatively the same characteristics. They have the same proportion in different categories of age and of education. As such, they faced the same realities, experienced similar needs, and developed the same assets and perspectives [30].

In contrast, the findings on the relationship between HL and place of residence, age, duration in formal education (higher diploma), chronic diseases, and social status are conclusive. 76.3% of our sample live in urban areas. Living in urban areas seems to have benefit on the development of HL knowledge and competencies. This result is in line with the results of Shi et al. that showed that urban residents had a higher proportion of participants with excellent HL compared to rural residents [54]. That might be surprising, as it contrasts with many research which find no significant relation between living in urban areas or rural areas and HL [52, 59], but in Cameroon the difference between rural and urban areas is considerable in term of development. To illustrate this, according to the ministry of post and telecommunication (2016) 12.3% in urban zones and 1.4% in rural zones have access to the internet at home. Therefore, citizens of urban areas appear to be more health literate since they have access to more health education through ICT tools. This is also confirmed by one result of this study. Specifically, participant who filled the online questionnaire are 2.472 times likely to have good HL levels than those who filled the paper copy. Moreover, results have revealed that high informational support modify the extent of the influence of HL [52].

Result of this study also indicated that people aged 55 and above are more likely to have poor health skills than younger persons. Furthermore, formal education is associated to HL. Among participants aged 15 to 96 years, those in the 25- to 34-year-old and 35- to 44-year-old age groups had the highest education level. The proportion of participants with excellent HL increased as participants obtained more education in many studies [9, 26, 46, 54]. In this research, the poorest mean index of HL was obtained by holders of secondary first cycle diploma. The holders of secondary first cycle diploma were 4,636 times more likely to have excellent HL than secondary first cycle diploma holders while holders of Doctorate/Ph.D. were 18,521 times more likely to have excellent HL than this category. A meaningful effect is observed between chronic diseases, social status and HL. The level of HL increases with a better state of health: people who declare having two chronic illnesses and more are less numerous to have excellent literacy level [54, 55]. In the same way, among the people whom declares more than 2

chronic illness, 89.3% have insufficient level of HL and 3.6% an excellent level, against 73.2% and 5.4% of those that declare no chronic illness, 76.2% and 5.7% of people that declare 1 chronic illness, and 88.5% and 7.7% of people that declare 2 chronic illness.

Another result of this research is the link between HL and satisfaction with life. The univariate analyses showed that HL was significantly associated with satisfaction with life. The higher the HL level, the more people have satisfaction with life. Self-rated health status was also related with the level of HL. As such, the findings are in line with results from other studies [20, 49, 60]. It was observed in their studies that street children with limited GHLE were likely to perceive their health as poor and vice versa. Finally, despite the fact that many independent variables are individually linked to HL, there are not many social determinants of HL. Beyond everything, the performing of the binary multiple regression model showed that Satisfaction with life, the type of questionnaire filled, language spoken, social status, region of residence and health status variables give better assessment of the direct effects these factors have on HL.

#### Limitations

This study is not without limitations. The Target population could be perceived as too young (mean age 27.99) when compared to 55.8 and 63.7 years obtained in others countries. In addition, participants were constituted solely of people of 15 years and more. Children and adolescents of less than 15 years who represent 42.5% of the total population of Cameroon were excluded from this study. Therefore an accent should be put on the design of tools that can measure the HL of children and adolescents under 15 years. The development of those tools should be based on the same or similar design that can permit the results to be compare to those of the general population. Otherwise, three regions of Cameroon has very weak representativeness in the sample. Future studies appear necessary to bridge the gaps of the present study. It would be more interesting to take into consideration proportional sample for each region. Additionally, several demographic variables which may have enhanced the interpretation of the results were not tested, such as marital status. Further studies should analyse these variables. Furthermore, the HL level of health organisations must be explored since it is known that health literate organization can improve individual HL [9, 60].

## 6. Conclusion

Given that HL is influenced by personal, situational and societal determinants, this study sought to describe the HL of Cameroon's general population and associated variables. Results indicated that at least a quarter of respondents have insufficient HL and almost three quarters had limited HL. Specifically, subgroups within the population with low HL are those with more than two chronic diseases, living in rural areas. Furthermore, participants with high HL evaluate their health as very good and are satisfied for their life. Since limited HL represents an important challenge for health

policies and practices across Cameroon, this study suggests that the influence of African socio-cultural aspect in HL must be considered when developing HL tools to ensure quality measurement and to improve health equity around the world. This study so far contributes to the growing field of research that seeks to understand HL, its association with determinants of health, and implications for health promotion and others interventions in the health system. In addition, this study contributes to the understanding of health disparities and the new frontiers to be explored to reduce them either through improving HL or through systems that are more adapted to HL in Cameroon. This study participates also to the evaluation of the validity of the HLS-EU-Q16.

## Conflicts of Interest

The authors declare no conflict of interest.

## Acknowledgements

Authors wish to thank Ngoumou Jean Fabrice, Tchankoua Nzoupet Sévérin, Anguissa Ndzana Ghislain, Fotsing Carlos Armelle, and Wetka Tchoupé Ulrich Parfait Lelong for their active participation for data collection in different regions of Cameroon. They also thank Saah Handson Kewihnu, Ngoumou Rose Danielle, Tachom Waffo Boris, Ekwe Brenda and Roland Agbor Roshing Tabeta for improving the English language quality.

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