Educommunication and Empowerment in Cardiovascular Health of Lisbon Citizens

Educomunicación y Empoderamiento en la Salud Cardiovascular de Residentes de Lisboa

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ABSTRACT

Online educommunication and empowerment are crucial dimensions in awareness, literacy and change processes, and their articulation may bring benefits to cardiovascular health, given that cardiovascular diseases are the deadliest in the world, including in Portugal. This paper aims to explore the relationship between online educommunication and empowerment in cardiovascular health, using Lisbon citizens as a case. The theoretical framework is composed by the interactivity and empowerment model, the health belief model and the uses and gratifications theory. The questionnaire survey was applied to a gender and age quota sample (N=400). The questionnaire includes thematic dimensions, such as online informative practices on cardiovascular health, the eHEALS scale, and the importance and effectiveness of the educommunicative message on cardiovascular health features. Results show that the educommunicative message has characteristics at the level of purpose, content, type, format, emotions, and logic, which enhance it the most. This indicates that exposure to messages with these characteristics may instigate empowerment and behavior change. Respondents self-rated with the most positive levels on the eHEALS scale, showing empowerment at the eHealth level, with age rather than gender differences. There is evidence that eHealth skills and having cardiovascular disease influence information seeking and empowerment. The main contribution lies in identifying characteristics of the cardiovascular health educommunication message that can optimize recipient's empowerment.

RESUMEN

La educomunicación en línea y el empoderamiento son dimensiones cruciales en los procesos de concienciación, alfabetización y cambio, y su articulación puede aportar beneficios a la salud cardiovascular, dado que las enfermedades cardiovasculares son las más mortíferas del mundo, incluso en Portugal. Este trabajo pretende explorar la relación entre educomunicación online y empoderamiento en salud cardiovascular, utilizando como caso los residentes del municipio de Lisboa. El marco teórico está compuesto por el modelo de interactividad y empoderamiento, el modelo de creencias en salud y la teoría de usos y gratificaciones. El cuestionario se aplica a una muestra por cuotas de sexo y edad (N=400). El cuestionario incluye dimensiones temáticas, como las prácticas informativas en línea sobre salud cardiovascular, la escala eHEALS, la importancia y la eficacia de las características del mensaje educomunicativo sobre salud cardiovascular. Los resultados muestran que el mensaje educomunicativo tiene características a nivel de propósito, contenido, tipo, formato, emociones y lógica, que lo realzan más, según la evaluación de los encuestados. Esto indica que la exposición a mensajes con estas características puede instigar la capacitación y el cambio de comportamiento. Los encuestados se autocalificaron con los niveles más positivos en la escala eHEALS, lo que demuestra su capacitación a nivel de eSalud, con diferencias más de edad que género. Existen pruebas de que las competencias en eSalud y el hecho de padecer una enfermedad cardiovascular influyen en la búsqueda de información y en la capacitación.

KEYWORDS | PALABRAS CLAVE

Educommunication, Empowerment, Cardiovascular Health, Online Communication, Lisbon, eHealth Literacy.
Educomunicación, Empoderamiento, Salud Cardiovascular, Comunicación en Línea, Lisboa, Alfabetización en eSalud.

1. Introduction

The human being is a communicational animal, being communication the starting point for his/her definition. Foucault's (1997) dictum that speech is power is famous, but the benefits of communication do not run out in the sender, that is, those who communicate have power and can also contribute to empowering others. In the context of cardiovascular health, educommunication –the articulation between communication and education– and empowerment are pivotal and pressing dimensions in a process of awareness, literacy, and change, given that cardiovascular diseases are the deadliest worldwide: about 17.9 million deaths every year, constituting 32% of all deaths worldwide (WHO, 2023). In Portugal, strokes are the leading cause of death and long-term disability, causing the highest number of deaths (11235) in 2018, representing 9.9% of mortality (INE, 2020). Portuguese people reveal little knowledge about these heart diseases (Andrade et al., 2018), which poses greater challenges to health communication focused on cardiovascular health.

The present study aims to explore the relationship between online educommunication and cardiovascular health empowerment. According to the literature (e.g., Muscat et al., 2023; Small et al., 2013), there is a virtuous circle in which communication is key to improve the patient's health literacy, empowering him/her, and this state allows and requires more competent communication and more informed decisions. However, literature also shows that interventions on knowledge, attitudes and practices (KAP) addressed by social media had limited effects (Cai et al., 2023). By understanding how knowledge, attitudes and practices are interconnected, it is possible to design more effective strategies to promote positive changes in health. Cognitive dissonance and deliberate ignorance can be overcome thanks to self-efficacy exercises (Kadel et al., 2023).

The conducted literature review shows that this thematic proposal addresses a research gap. A Boolean search conducted in May 2023 on the EBSCO platform, with the search words 'empowerment or empowering or empower' AND 'cardiovascular' AND 'educommunication', without temporal or language restrictions and with the limiter 'peer-reviewed', returned no results, which confirms the literature shortage.

Emerging in Latin America in the late 1960s and 1970s, and highlighting a different radical understanding of communication and education as transformational and liberating interrelated fields (e.g., Aguaded & Delgado-Ponce, 2019; Tárcia et al., 2023), educommunication is considered a strategic tool facing health issues (e.g., Martínez-Sala & Peña-Acuña, 2023) and an empowerment tool, promoting participation and social change (Aguaded et al., 2022). Exploring the etymology of the terms, the verb 'to communicate' means 'to share', 'to be accessible to all', while 'to educate' means 'to draw from, to extract, to bring out' (Aguaded & Delgado-Ponce, 2019: 1)–for example, to bring out something that is within us and, by extension, to produce, build, expose knowledge, and values to the world. The convergence of the two disciplines moves by the idea of forming critical, responsible, participatory citizens who can comfortably inhabit the ever-changing media ecosystem through shared knowledge. UNESCO (1982) adopted the term educommunication to refer to all means of studying, learning and teaching, in all circumstances, the history, creativity, use, and evaluation of media as practical and technical arts, as well as to the place occupied by media in society, its social impact, the consequences of mediatized communication, participation, the modification of perception forms generated by media, and media access.

In this context of educational purposes, health communication has characteristics that can be explored: (1) Goals to achieve: to adopt healthy behaviors, empower, facilitate resources, and knowledge/ awareness, to inform, influence healthy behaviors, motivate, and exchange information/dialogue (Baptista, 2022); (2) Message contents: fundraising; festivities; health education/news; focus on people; material for professionals; no information (not informative); cross-promotion; promotion of the organization (Ramanadhan et al., 2013); (3) Type of adopted message, based on the health belief model which is a set of constructs for the prediction of health-related behaviors: confidence in being able to change behavior (self-efficacy); effectiveness of healthy behaviors (perceived benefits); strategies to activate healthy behaviors (signals to act); likelihood of contracting a disease (perceived susceptibility); risks of a particular disease (perceived severity); sacrifices of changing to healthy behaviors (perceived barriers) (Ghomi et al., 2019); (4) Format: emoji; event; photo; hashtag; cross share; health organization website share; text; text and photo; text and video; video; (5) Qualities that attribute more confidence to the message: ability; knowledge; credibility; identity (e.g., Belim Rodrigues & Lagido, 2021); (6) Characteristics that convey emotions: admiration; awareness; guilt; pain/loss; empathy; empowerment; stimulus for reflection and action; humor; anger; fear/rejection; motivation; shame (e.g., Baptista, 2022; Belim Rodrigues & Lagido, 2021); (7) Characteristics that convey a logic/consistency to the message: truth and logic; reference to

statistical data; medical evidence; figures of speech; use of examples; use of questions; use of iconic and plastic language; technical terms; use of foreign words (Belim Rodrigues & Lagido, 2021).

Empowerment, in turn, is the process in which people create or are given opportunities to control their own destiny and influence decisions that affect their lives (Zimmerman, 1995). The concept of empowerment can be traced back to the Brazilian Paulo Freire (1973), who emphasized education as a tool to liberate marginalized people in Latin America in the 1970s and 1980s. The goal in being empowered is to acquire tools and control to prevent threats and improve positive aspects of life. This empowerment is based on knowledge and skills, while it promotes life quality, and facilitates the ability to choose appropriate strategies to control required resources to achieve favorable consequences (e.g., Nikbakht Nasrabadi et al., 2015). Patients describe empowerment in five dimensions: identity, knowledge and understanding, personal control, personal decision making, and empowerment of other patients (Small et al., 2013). Health literacy, broken down into health knowledge, processing and using information about health, and ability to maintain health (Liu et al., 2020), has functioned as a tool for empowerment (Porr et al., 2006).

Educommunication and empowerment find new challenges and opportunity to thrive in the digital environment. As Huo et al. (2019) emphasize, the number of online social media users has substantially increased in the last decade, creating an opportunity for healthcare organizations, professionals, and patients to leverage the use of digital platforms to benefit health communication. Online communication is characterized by the possibility of interactivity. Barry and Doherty (2017) propose the interactivity and empowerment model, based on actions, contexts, strategy, and outcomes. The authors explain that interactivity enables potential actions; it creates contextual potentialities to change the content and roles of participants; it facilitates communication strategies, such as learning, sensory experiences, or social connection. Interactivity also offers potential for different communication outcomes, including emotional, political, or celebratory implications. This article builds on this model, assuming that respondents' exposure to online cardiovascular health messages can empower them through actions, contexts, strategies, and outcomes.

Online communication changes the way people access and trust health information (e.g., Berg et al., 2021). The Internet can act as a double-edged sword, both empowering (e.g., access to advanced information, knowledge retrieval, convenience of information access) and disempowering on health issues (e.g., fake news, misinformation, need for evaluation of health information sources, which widens the gap between 'information-rich' and 'information-poor' users) (Korp, 2006).

To measure the combined knowledge, comfort, and perceived abilities of individuals to find, evaluate, and apply electronic health information to health problems, Norman and Skinner (2006) created an eight-item eHealth literacy scale (eHEALS). This scale is based on six competencies: traditional literacy, health literacy, information literacy, scientific literacy, media literacy, and computer literacy. Another instrument, the Digital Health Literacy Instrument (DHLI) serves the same purpose, assessing seven subconstructs. But, for example, the study by Park and Kwon (2021), which examined the validity of the DHLI, suggests revision points for assessing adolescent digital health literacy.

The literature review found that some people seek health information to gain control and knowledge, to increase self-efficacy, to choose a lifestyle, or to gain a sense of power over staying healthy or preventing disease, rather than to address existing health conditions (e.g., Wong & Cheung, 2019). These goals related to control, competence, knowledge, and action constitute components of empowerment (Cattaneo & Chapman, 2010).

People who act motivated by empowerment value information that can empower them. Chang (2020) demonstrates that health-conscious people find messages in this field more credible and, in seeking control, tend to value information, such as health news that enhance their sense of control. However, Chang's research focuses on health news in general and not on specific features. These types of characteristics (e.g., scientific value of information) are addressed by Chang (2022). In this study, the author explores the scientific value of information features in health news by conducting an analysis in the United States and Taiwan of perceptions based on a survey and on an experimental test concerning the causal effects of information exposure. The author found an empowerment effect generating more empowerment. That is, health-conscious people seek out health information, they value the elements of scientific information, they are persuaded by it, and act on advice. From this effect, the hypothesis is formulated: H1. The receivers' level of cardiovascular eHealth literacy skills [empowerment] influence

their demand for online educommunication messages about cardiovascular health [empowerment]. Since health concern promotes empowerment, another hypothesis is formulated: H2. Having cardiovascular disease influences cardiovascular eHealth literacy skills [empowerment]. Similarly to Chang's study (2022), this article also aims to assess the importance that Lisbon citizens attach to certain properties of the available information in online platforms regarding cardiovascular health.

From the above, two research questions are formulated:

- Q1. Which specific content and form characteristics of the educommunicative message on cardiovascular health contribute to improve the connection with Lisbon citizens?
- Q2. How do Lisbon citizens evaluate the effectiveness of specific features of the educommunicative message on cardiovascular health?

2. Materials and Methods

The used method is quantitative, and the technique is the online questionnaire survey. The universe consists of adults living in Lisbon municipality (N=412,104).

2.1. Sample

The sample is non-probabilistic, organized into gender and age quotas, considering that they refer to non-modifiable risk factors. The quota sample is the type of non-probability sampling closest in representativeness to the probability sample, and its results are statistically equivalent to those of the probability sample (Yang & Banamah, 2014). Additionally, quota sampling exhibits 'greater rigor' when compared to other non-random samples. In most modern web-based investigations, this type of sample has become standard, with the advantages of speed and savings in its organization. However, the quota sample also has associated disadvantages: it still does not represent the population as a whole; it is impossible to assess the possible sampling error.

The quota sample composition follows the following steps (Im & Chee, 2011): (1) Defining the sample size; (2) Selecting variables, such as gender and age; (3) Defining the distribution frequency for each variable. During the survey application, the participation of members belonging to the quotas is encouraged and other answers are discarded.

From the Statistical Yearbook of the Lisbon metropolitan area 2018 (sampling frame) and applying the sample calculation for populations over 100,000 cases, it was found that the required sample size is 400. The sample is composed of 56.0% women and 44.0% men, with more individuals aged 65 and older (34.8%), married or in a consensual union (57.8%] and with a college degree (48.1%). 30.8% of the sample suffered from cardiovascular disease.

2.2. Questionnaire

The questionnaire consists of closed and semi-closed questions related to online informative practices on cardiovascular health, the eHEALS scale, importance and effectiveness of the educommunicative message features on cardiovascular health, and sociodemographic characterization of the respondents. Health communication characteristics were used in the construction of the questions. The eHEALS was the chosen scale to evaluate eHealth literacy because: 1. it was designed for simple, easy administration, and thus can be used on its own or incorporated with other measures of health as part of a standard health assessment battery (Norman & Skinner, 2006); and 2. through a scoping review, Faux-Nightingale et al. (2022) assessed available tools that can be used to evaluate digital health literacy, discovering that eHEALS is the most commonly used instrument to assess eHealth literacy and whether an individual is able to actively engage with eHealthcare or digital resources. To adapt the scale to the Portuguese context, the translation of eHEALS scale was done by experts on health communication and health literacy, a ninth question related to understanding was incorporated into the original scale, and all questions were submitted to a pre-test to assess enunciation clarity. In questions with a Likert scale (to measure the evaluation of importance, effectiveness), and in eHEALS five levels were used. Given that empowerment is a psychological state that occurs as a result of effective communication in healthcare (Small et al., 2013), in Likert scale questions it is assumed that higher levels (e.g., Totally important and Very important) may be instigators for empowerment processes of the subjects exposed to online cardiovascular health messages. That is, respondents' exposure to messages with

certain valued properties will tend to contribute to respondents controlling their own destiny and influencing decisions that affect their lives (Zimmerman, 1995).

The value of Cronbach's alpha, which aims to ascertain the internal consistency or reliability of the questionnaire, is 0.925 for 34 items, a 'near perfect' value on Landis and Koch's scale.

The survey distribution took place between May 10 and May 31, 2021, specifically in health dedicated Facebook groups. To fine-tune the survey quality, a pre-test was conducted with 40 individuals between May 1 and May 9, 2021.

To accommodate the requirement of the 65+ age group and to combat the digital divide present in this age group, which was verified when distributing the online survey, the survey was also administered face-to-face. This administration took place between June 7 and 11, 2021. Given the pandemic period, the need for social distance, and the preference of outdoor activities to closed spaces, which made more classical techniques of sample selection at home unfeasible, the survey was administered in a non-probabilistic form in the streets of Arroios parish. This parish was chosen because it is amongst those with largest aging population, and it is also on the list of parishes with more than 35 thousand elderly living in social isolation. The individuals were approached according to their age appearance and age group intended to participate in the survey and, after age confirmation, the thematic nodes and study objectives were presented, and they were invited to voluntarily participate.

2.3. Statistical Analysis

Using SPSS, a univariate and bivariate analysis is performed, with the chi-square test, to explore and discover the relationships between statistically significant variables. The application of the chi-square test is validated when there are no more than 20% of the cells with expected frequency less than five and the asymptotic significance is less than 0.05. There was a need, from the responses to the nine items of the eHEALS scale, to generate a sum-score ranging from 1 (Strongly Disagree) to 5 (Strongly Agree). The eHealth literacy levels are classified to fall into three groups: low (up to 24), medium (25-39), and high (40 and above).

3. Analysis and Results

This section is organized into the following points: sample characterization (eHealth literacy skills of Lisbon residents, their online information practices on cardiovascular health), answers to the two research questions and hypotheses confirmation.

3.1. eHealth Literacy Skills

On all items of the eHealh literacy scale, respondents tended to self-assess with the most positive levels, showing empowerment at the eHealth level (Table 1).

Table 1: Respondents' Cardiovascular eHealth Literacy Skills.					
Items	Totally Disagree	I Disagree	I Neither Disagree nor Agree	I Agree	Totally Agree
I know how to find useful resources about cardiovascular health on the Internet.	4.5	6.0	5.5	68.5	15.5
I know how to use the Internet to answer my cardiovascular health questions.	4.8	6.0	9.0	41.5	38.8
I know that resources related to cardiovascular health are available on the Internet.	4.8	6.3	7.0	47.3	34.8
I know where to find useful resources about cardiovascular health on the Internet.	4.5	7.5	6.8	50.5	30.8
I know how to use the information about cardiovascular health that I find on the Internet.	5.3	5.8	6.8	51.0	31.3
I have the skills to evaluate the resources on cardiovascular health that I find on the Internet.	5.3	7.0	7.5	43.0	37.3
I can distinguish between high-quality and low-quality cardiovascular health resources that I find on the Internet.	4.8	7.0	5.0	49.0	34.3
I feel confident in using information I find on the Internet to make decisions related to my cardiovascular health.	5.3	7.5	6.0	45.5	35.8
I understand the messages about cardiovascular health that I find on the internet.	4.5	5.5	8.5	43.8	37.8

3.2. Online Information Practices on Cardiovascular Health

55% of the sample uses online platforms to obtain information about cardiovascular health. The age group that does this most is 35-44 years old (62.1%). Conversely, the age group that does it the least is 18-24 years old (44.8%), followed by the oldest age group, 65+ year-old (50.4%). Values are approximate if we consider gender: 55.1% men versus 54.9% women use online platforms to obtain information on cardiovascular health.

The most expressive percentages focus on the positive evaluation of online social networks: 43.2% of respondents indicated online social networks as very important, 34.5% as important and 9.5% as totally important, totalling these three positive levels 87.2%. On the other hand, 11.4% of surveyed Lisbon citizens indicated that they are not very important and only 1.4% of respondents evaluated them as not important at all. Concerning gender, the same trends were found: very important (men: 40.2%; women: 45.5%), important (men: 40.2%; women: 30.1%), not very important (men: 11.3%: women: 11.4%), totally important (men: 8.2%; women: 10.6%), and unimportant (men: 0.0%; women: 2.4%). Considering age, each age group indicates more times the 'very important' assessment level, except for the 65+ year-old group, who chose 'important' the most (47.1%). The website is the favorite digital platform to obtain information on cardiovascular health (47.3%), followed by Facebook (26.8%) and YouTube (18.6%). This preference trend for the website continues with age, with exceptions: young people prefer Instagram (38.5%) and older age groups prefer Facebook (65+ year-old: 47.1%; 55-64 years old: 42.9%). Differences are noted considering the gender variable: women prefer the website (56.9%), Facebook and YouTube (both with 19.5%), while men prefer Facebook (36.1%) and the website (35.1%). Answers regarding the trust placed in each online platform follow, almost entirely, the same order verified in the general preference: website (53.2%), Facebook (25.0%) and YouTube (15.0%). This trend of greater trust on the website is noticed between men and women and in different age groups, except for the oldest who trust Facebook more (65+ year-old: 47.1%; 55-64 years old: 40.0%).

3.3. Characteristics of the Educommunicative Message on Cardiovascular Health that Contribute to Improving the Connection with Lisbon Citizens

For every message objectives, the very important evaluation was the one with the greatest consensus among respondents, and the first four objectives had the most responses with this level of evaluation. Among the most valued objectives were: 'Adopt healthy behaviors' (very important– 57.8%; totally important– 21.0%), 'Influence healthy behaviors' (very important– 52.0%; totally important– 29.0%), and 'Empower' (very important –52.8%; totally important– 23.0%).

In the remaining objectives, the same response pattern can be seen, and it is also possible to observe that only in 'exchange information/dialogue', the very important evaluation does not exceed 50% of respondents (44.0%). None of the objectives had a significant low evaluation –not at all important or not very important– with values of no more than 2.5%.

Among the contents of messages focusing on cardiovascular health, 'health education' (54.3%), 'fundraising' (51.0%), 'news' (50.2%) were most often rated as very important. The contents most frequently rated as totally important were 'health education' (30.8%) and 'news' (28.5%). In the other contents (focus on people, material for professionals, content without information, cross promotion, promotion of the organization and festivities), the evaluative levels very important and totally important were less evident.

About the type of online cardiovascular health message, 'self-efficacy' (63.2%), 'perceived severity' (53.3%), 'perceived barriers' (51.7%), 'signs to act' (51.2%), and 'perceived susceptibility' (51.0%) got the very important evaluation. 'Signs to act' (34.8%) and 'perception of susceptibility' (33.5%) are most rated as totally important. The not at all important option never exceeds 1.0% in all message types.

The features that respondents most prefer to find in cardiovascular health messages are 'text and video' (31.3%) and 'text and photo' (28.5%). 'Emoji' and 'hashtag' had the preference of only one respondent each.

3.4. Lisbon Citizens' Evaluation of Specific Features Effectiveness Concerning the Educommunicative Message on Cardiovascular Health

Concerning the four characteristics of ethos that endow a message about cardiovascular health with more effectiveness, the most scored response was always very important, noting a greater predominance

in 'knowledge' (49.5%) and 'credibility' (48.8%). These two characteristics were also the ones that gathered the most responses in the totally important option: 'credibility' (39.3%) and 'knowledge' (37.3%).

Regarding the effectiveness level of the emotions aroused in the public from messages about cardiovascular health, in all evaluated emotions the very effective level is most present. This level exceeds 50% in 'admiration for a person/initiative' (57.0%), 'awareness' (52.5%), 'stimulus to reflection and action' (51.2%) and 'empathy' (50.2%). Of all the emotions, only in 'admiration for a person/initiative', 'anger' and 'fear' did the fully effective evaluation not go around 30%. The fully effective evaluation tended to be the second most chosen, except in 'admiration', and with greater predominance in 'motivation' (35.3%). The not at all effective evaluation is most significant in the 'anger' (2.5%), and 'shame' (2.3%) emotions.

Among the characteristics conveying logic/consistency, in two 'medical evidence' (55.3%) and 'reference to statistical data' (50.5%) the very effective option gathered most respondents' choices, thus exceeding 50%. In the characteristics 'use of iconic/plastic language', 'use of question', 'use of examples', and 'truth and logic', the very effective rating was also the most chosen, but never exceeded 50%. In 'use of foreign words' (34.8%) and 'technical terms' (30.3%) characteristics, the most responded evaluation was not at all effective. In the 'use of question' characteristic, the not at all effective level exceeded the effective level (12.0% vs. 11.3%). In 'style figures', the evaluations very effective and totally effective received the same number of responses: 27.3%. The totally effective option tended to be the second most chosen, except for 'use of foreign words' and 'technical terms', and with a value of more than 25%. In the case of 'truth and logic', this evaluative level exceeds 40% (42.3%).

3.5. Confirmation of Hypotheses

Hypotheses 1 and 2 were confirmed as there are statistically significant associations at the level of ≤0.05 between cardiovascular eHealth literacy skills [empowerment], and seeking online educommunication messages about cardiovascular health [empowerment] (p=<001), and having cardiovascular disease and cardiovascular eHealth literacy skills [empowerment] (p=<001).

4. Discussion and Conclusions

Most respondents use online platforms to obtain information on cardiovascular health, rating online social networks and websites for cardiovascular health as very important. These results are confirmed by previous scientific contributions that highlight the population's interest in obtaining cardiovascular health information from the tools included in the online environment (e.g., Eshah, 2018). These results are linked to uses and gratifications theory of communication, as the use of digital media by publics and the benefits deriving from this use are highlighted.

It is curious that the age groups that least use digital platforms to learn about cardiovascular health are the youngest and the oldest. A possible argument that justifies this low demand by young people may be the lack of interest in the subject based on the absence of the problem. In other words, because they are younger, they do not tend to deal with cardiovascular problems, given that age is a risk factor for heart disease and, therefore, as age advances the probability of suffering from these health problems increases (Rodgers et al., 2019). The low use of digital media by older people can be justified by the digital divide which is one of online social media disadvantages in the service of health communication (e.g., Gil, 2019). The older age group tends to have lower digital literacy, making it one of the most 'vulnerable to infoexclusion' (Gil, 2019: 84) groups.

Regarding gender differences, though literature still reveals a so-called second-level gender digital divide in developed countries in terms of equal access not resulting in equal use or digital skills (Acilar & Sæbø, 2023), our results did not reveal significant gender differences at this level. If, in our study, cardiovascular eHealth literacy skills do not seem to significantly differ between men and women, it is noteworthy that an Italian-based study on cardiovascular risk perception and knowledge in women (Maffei et al., 2022) highlighted their still low perception of risk, and the need to improve knowledge, although this study shows that Italian women scored higher for knowledge of cardiovascular disease and the main cause of death than those from United States and Australian.

Surveyed Lisbon citizens prefer the website, as well as Facebook, to get informed about cardiovascular health and rate them as more reliable among other digital platforms. In the literature, for example, reviews of diabetes websites showed that these platforms presented didactic information of varying quality, required

advanced reading levels, and followed a static newspaper-like display, rather than taking advantage of the inherent advantages of websites, such as interactive technology, social support, and problem-solving assistance (e.g., Bull et al., 2005). In a systematic review, it was found that the use of more interactive tools was associated with continued website use and greater clinical improvement (Yu et al., 2012). In addition, greater website use was correlated with greater clinical improvements. For example, the results of the study by Yu et al. (2014) underline the need to provide more 'practical' patient-centered content, in balance with 'evidence-based medical content' and confirm website features importance such as the reliability and authority of information and the sending of reminders to ongoing user engagement.

The respondents' emphasis on Facebook corroborates previous research that praises this online social network as a pedagogical and cardiovascular health promotion tool (e.g., Eshah, 2018). For example, Eshah (2018) found that most respondents expressed interest in receiving pedagogical information through online social networks, rather than conferences, individual instructions, and brochures, since, due to their pragmatism, they facilitate consultation of pedagogical programs and allow contact with professionals.

Respondents recognize the importance of cardiovascular health communication goals, highlighting adopting and influencing healthy behaviors, and empowerment. These goals are definitional to the concept of health communication (Belim Rodrigues & Lagido, 2021). As recognized by the literature (e.g., Khan et al., 2022), patient empowerment is an important concept in modern medicine and one of the central pillars of health communication strategies. Several models of strategic health behavior and social change communication, such as the precede-proceed model, support the notion of individual and community empowerment.

Within message content in cardiovascular health, 'health education' and 'news' stand out from the conducted survey. Several studies show the contribution of health education to better health outcomes (e.g., Chawla et al., 2019). For example, the study by Chawla et al. (2019) highlights that effective health education improves knowledge, attitude, and practices, especially regarding lifestyle modifications and dietary management, culminating in better glycemic control that can slow the progression of diabetes and prevent later complications. Also, the importance of medical and health news and information is recognized by medical researchers, medical professionals, and journalists (Picard & Yeo, 2011). Publics' understanding of medical and health news and information is crucial to perceptions of its importance to their lives and families, and to their behavioral responses to it (Picard & Yeo, 2011). The broad reach requirements of news imply the use of clear and accessible language, which enables more immediate understanding, unlike scientific articles that, despite offering scientifically proven information on the Internet, are written by professionals and thus contain technical terms that are not easily understood by laypeople (Kim et al., 2018).

Both the more negative (e.g., perceived severity, perceived susceptibility) and more positive (e.g., self-efficacy) types of messages are valued by respondents. This is in line with Saffari et al. (2020) results, which show the effectiveness of all constructs of the health belief model –from which the message type categories were drawn– in the progression of healthy behaviors, although 'self-efficacy' was the one with the best results. But, for example, studies find that publications with a positive tone have the highest engagement (e.g., Kite et al., 2016). Also, perceived benefit, compared to perceived risk, is a stronger predictor of online public engagement (Shah & Wei, 2022). However, negativity positively influences attitudes, behaviors, and intentions towards adopting healthy habits (Tannenbaum et al., 2015), and is also considered a promising strategy.

The most praised format was the combination of text and image, which is in line with the results of previous studies showing that the highest engagement publications are those with images in their composition (Rus & Cameron, 2016) and that videos are the format that creates the highest engagement (Kite et al., 2016). The use of visual and multimedia elements is one of the advantages of eHealth communication, helping to systematize the information and contributing to message effectiveness (Noar & Harrington, 2012).

Knowledge and credibility are rated by surveyed Lisbon citizens as the ethos characteristics that endow a cardiovascular health message with the greatest effectiveness. Understanding and perceptions of source credibility significantly determine how health and risk messages are processed and can also influence relevant behaviors (Hocevar et al., 2017). Source credibility is affected by perceptions of trustworthiness and knowledge of the source under evaluation (Hocevar et al., 2017). The authors caution that the conceptions of source credibility have changed dramatically with the use of online platforms: while previous definitions of source credibility were rooted in their credentials as indicators of knowledge on a certain topic, recent

conceptions point to layperson knowledge based on experience with a health problem (Hocevar et al., 2017).

Emotions can be powerful motivators of human behavior (Bessarabova et al., 2020). Surveyed Lisbon citizens evaluate several emotions, positive or negative, as effective. In this regard, studies show: (1) the importance of considering the interplay of different emotions when applying negative emotional appeals (e.g., Bessarabova et al., 2020); (2) the effectiveness of messages that use positive emotions (Ort et al., 2021); and (3) that perceptions of two types of threat –physical and social– create negative emotions related to fear, shame, and guilt, which in turn impact persuasion (Becheur & Valette-Florence, 2014). Although not at all effective evaluation is most significant in 'anger' and 'shame', in Becheur and Valette-Florence's (2014) study, shame, resulting from exposure to a social threat related to peer evaluation (e.g., smoking, unhealthy eating practices), had the strongest impact on persuasion compared to the other emotions of fear and guilt.

Among the characteristics that most effectively convey logic/consistency, the present study highlights 'medical evidence', 'reference to statistical data', and 'truth and logic'. These results align with those of Chang (2022) who shows the empowering effectiveness of health information scientific value.

From the results, recommendations can be made for the construction of online messages on cardiovascular health aimed at empowering publics, such as: (1) Knowing the target public and adapting the educommunicative message to their characteristics; (2) Combining the use of various digital platforms; (3) Considering the preferences and trust in digital platforms according to age and exploring new educommunication languages present in recent online social networks, such as Instagram and TikTok, which attract more young people, but also considering a possible second-level gender digital divide related to differenciated use and appropriation of platforms; (4) Exploring websites interactivity; (5) Assuming as objectives of online messages to adopt and influence healthy behaviors, and to empower; (6) Focusing on content such as health education and news; (7) Building positive messages (e.g., self-efficacy and negative (e.g., perception of severity); (8) Combining image and text; (9) Exploring knowledge and credibility as reliability factors in the message; (10) Using positive (e.g., self-efficacy) and negative (e.g., perception of seriousness) appeals; (11) Leaning on 'medical evidence', 'reference to statistical data', and 'truth and logic' to convey logic and consistency more effectively; (12) Not forgetting that interactivity and empowerment create empowerment.

In terms of limitations, researchers' absence when the respondent completed the online questionnaire may be one, as the researcher could not explain possible ambiguous or unfamiliar concepts to the respondent. To avoid this limitation, the questionnaire was constructed using simple and clear language and a pre-test was conducted. Furthermore, not all the population is comfortable with technology, such as the elderly, which required a hybrid solution for distributing the questionnaire to this age group. Given that eHEALS is a self-assessment scale, there may have been some social desirability bias.

For future studies, we propose the application of qualitative techniques, such as focus group or interviews to understand in depth the empowerment of publics when exposed to educommunicational messages on cardiovascular health. Experimental studies, in which messages of this type are shown and the effects on participants are observed, may also be an option for future study. Given that cardiovascular health is a worldwide problem, comparative studies would be pertinent to understand educommunication practices and their influence on empowerment regarding this health issue, also further exploring related gender differences between diverse sociocultural contexts.

This study offers contributions of various kinds: 1. thematical: the study proved that the receivers' cardiovascular eHealth literacy skills [empowerment] influence their demand for online educommunication messages about cardiovascular health [empowerment] and that having cardiovascular disease influences cardiovascular eHealth literacy skills [empowerment]; 2. theoretical: through the application of the theoretical assumptions of the health beliefs model and the interactivity and empowerment model, and the uses and gratifications theory to the study of online educommunication on cardiovascular health in a sample of residents in Lisbon municipality, the study shows the usefulness of the theoretical framework for understanding and explaining the phenomenon; 3. methodological: by using the eHEALS scale, with an additional item linked to message understanding, in the scope of cardiovascular health of Lisbon citizens, the study reveals the scale's measuring potential in specific health contexts; 4. Practical/professional: by providing recommendations for cardiovascular health senders/communicators in an online ecosystem; and 5. social: this study's results can help to improve online educommunication about cardiovascular health, preventing cardiovascular diseases and promoting heart health among communities, by empowering them.

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Author Contribution

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