The Importance of Communication for Health Outcomes

Danica Mamula Tartalja, Gordana Jelić i Enis Osmani

***Abstract*—Communication in mHealth can be looked at from several aspects, such as technological, medical, or the aspect of interpersonal communication. In the domain of doctor-patient interaction, apart from face-to-face communication in the doctor's office, communication can also be studied through various written genres enabled by the application of modern technologies in mHealth. This paper analyzes communication skills, specifically the ability to effectively convey information through communication via e-mail, SMS text messaging, portals and social networks. Analyzing the use of different communication methods based on health literacy, gender, age, income, race, ethnicity, and other criteria is the pathway to positive outcomes of health interventions and patient-centered care.**

***Key words*: communication, mHealth, health literacy**

I. Introduction

Information delivered via the Internet and related technologies is generally referred to as eHealth [1]. Mobile health (*mHealth*) is defined as the use of mobile devices to support personal and public health. Regardless of delivery methods, the amount of health information available to the public and the modalities for accessing health information have increased significantly. This increase has made health literacy more difficult to address [2].

The growth of ICT is perhaps the main reason for the evolution of the definition of health literacy, from early definitions that included the ability to read to a much broader one: "the degree to which individuals have the ability to find, communicate, process and understand the basic health information and services needed to make appropriate health decisions" [3].

The term "health literacy" was first mentioned by Simonds [4] in 1974, proposing the introduction of subjects in the school curriculum that will enable students to become health literate. However, although this idea did not take root, the concept itself gained a new, broader meaning and today, according to the WHO [5], it is described as a set of personal, cognitive and social skills and competencies that people develop in order to search for, understand, evaluate and apply health information, and make the right decisions regarding treatment, disease prevention, health care promotion and increasing the quality of life. Nutbeam [6] identified and defined three levels of health literacy. In order to achieve greater autonomy and personal empowerment, in addition to functional, basic health literacy, one should strive to achieve communicative and critical health literacy, as higher levels of knowledge, motivation and interpersonal skills that constitute a good prerequisite for making correct decisions regarding the health of the individual, as well as of society as a whole.

In addition to adversely affecting the health of the population, a low level of health literacy increases the overall economic costs of health care [7, 8]. Inadequate health literacy increases the use of emergency services and the need for hospital treatment, which is all a result of lack of skills and information about improving one's own health, inadequate use of therapies, lack of trust in medical advice, reduced ability to express health problems and poor communication with health professionals [9]. In 2016, at the Ninth Global Conference in Shanghai, the World Health Organization defined three basic pillars of health promotion: the role of the state government, preserving healthy cities, and increasing the level of health literacy [10].

The level of health literacy is associated with health outcomes. Given the fact that health literacy is influenced by many factors, such as education level, age, income, race, and ethnicity, it could be concluded that differences in health literacy levels contribute to health disparities [11]. A low level of health literacy is a barrier for many patients. Patients with low health literacy have poor communication with their doctors and thus face adverse health outcomes. Mobile phone technology could be used to implement strategies to improve communication between patients and their doctors. Text messaging is a simple and interactive platform that may be ideal for patients with low health literacy.

The concept of eHealth literacy is introduced and defined as the ability to search, find, understand and evaluate health information from electronic sources and apply the knowledge gained to addressing or solving a health problem [12].

Today, eHealth literacy includes all aspects of traditional literacy and mathematics, media, computer, information and scientific literacy, as well as traditional health literacy [13]. With the development of information and communication technologies, the field of eHealth has evolved from the content of services, providers, users and other large systems to a way of thinking, and the term "digital health" is increasingly being used [14].

Danica Mamula Tartalja – Academy of Technical and Art Applied Studies Belgrade, Department School of Information and Communication Technologies, Zdravka Čelara 16, 11000 Belgrade, Serbia (e-mail: danica.mamula@ict.edu.rs), ORCID ID https://orcid.org/0000-0003-2857-982X

Gordana Jelić – Academy of Technical and Art Applied Studies Belgrade, Department School of Information and Communication Technologies, Zdravka Čelara 16, 11000 Belgrade, Serbia (e-mail: gordana.jelic@ict.edu.rs), ORCID ID (https://orcid.org/0000-0002-9390-3625)

Enis Osmani – Academy of Technical and Art Applied Studies Belgrade, Department School of Information and Communication Technologies, Zdravka Čelara 16, 11000 Belgrade, Serbia (e-mail: enis.osmani@ict.edu.rs), ORCID ID (https://orcid.org/0009-0000-0626-3985)

 ISBN 978-86-7466-969-3

E-health literacy, mHealth literacy and digital literacy are terms used in different ways by different researchers in different contexts. According to the WHO's definition, digital health includes new fields such as big data, genomics and the use of advanced computer science in artificial intelligence, as well as mobile health and eHealth. However, eHealth literacy is an important indicator of the use of personal health technology [15]. If the level of eHealth literacy is low, it is considered that it will be difficult to have digital health literacy.

In this paper, we want to point out the need to identify the level of health literacy, as well as possible ways to improve health outcomes by the use of technologies for less literate categories of people so that they can access, understand, evaluate and apply health information.

II. Method

The literature states that today there are more than 130 tests used to assess health literacy, the most famous of which are TOFLA [16] and BRIEF [17]. For the purposes of this paper, we conducted an anonymous survey primarily aimed at checking the respondents' ability to understand common medical terms. The questionnaire consisted of five questions. In the first question, respondents were asked to fill in the table by choosing a word or an expression that is related to the given medical term in terms of health. The table was modeled after the SAHL test [18] and consisted of 15 items. The second question was open-ended and required a translation or an explanation of 5 given medical terms. The remaining three questions offered multiple answer options and referred to the respondents' health habits and their willingness to use electronic media for consultations with a doctor.

The sample included 128 respondents from our closest work environment and the aim of this paper was to examine their functional health literacy through identifying the given medical terms and understanding the text, as well as to determine their health habits. The main distinctive features of our sample included age, gender and level of education. 85 students and 19 professors from the Department School of Information and Communication Technologies, ATUSS Belgrade, as well as 14 elderly visitors of a pharmacy in the Belgrade municipality of Vračar participated in the survey.

III. Main findings and discussion

Based on the analysis of the table containing medical terms, as well as the open-ended question that required the respondents to explain the given terms, adequate health literacy was found in the group of professors, all of whom are employed in higher education institutions. Out of a total of 20 given terms, female professors provided 100% correct answers for 10 items, while male professors provided 100% correct answers for 16 items. A somewhat lower level of medical term recognition was found in respect to the words *incontinence* (f. 46%/m. 46%), *constipation* (f. 77%/m. 83%), *anti-inflammatory drugs* (f. 30.8%/m. 67%), *anamnesis* (f. 84.5%/m. 50%). The female professors stated one incorrect response in respect to the following four terms: *tonic, resistance, hypertension, aneurysm*, two incorrect answers were provided for the term *rupture*, and four incorrect answers for the term *hyperthermia*.

Among the student population, only three items: *dental caries, stroke, paralysis* were answered 100% correctly by the students of both genders. Based on the percentages i.e. level of recognition of other medical terms, it can be concluded that students have an inadequate level of health literacy: *incontinence* (f. 46%/m. 32%), *anemia* (f. 80%/m. 78%), *thrombus* (f. 67% /m. 68.5%), *curettage* (f. 20%/m. 28.5%), *tonic* (f. 53%/m. 54%), *collapse* (f. 67%/m. 78%), *aneurysm* (f. 60%/m. 71.4%), *rupture* (f. 73%/m. 65.7%), *immobilization* (f. 60%/m. 71.4%), *hyperthermia* (f. 20 %/m. 62.3%), *constipation* (f. 46%/m. 53%), *hemorrhoids* (f. 87%/m. 77%), *resistance* (f. 27%/m. 42%), *hypertension* (f. 1%/m. 13%), *glucose* (f. 60%/m. 57%), *anti-inflammatory drugs* (f. 0%/m. 20%), *anamnesis* (f. 13.3%/m. 11%). According to the above statistics, it can be seen that female students answered 8 items and male students answered 6 items by stating less than 50% of correct responses respectively.

Only one of the given terms etymologically originates from the German language (German Schlag=stroke), while all other terms are derived from ancient Greek or Latin. It is obvious that the level of health literacy increases with an increased number of years of formal education. In addition to direct knowledge of terminology, whether due to experience or use of medical literature, users of medical services can identify the meaning of certain terms based on analogies from some other fields. For example, the Latin prefix *in-* and its allomorph *im-* have a negative meaning i.e. they are used to make a negative version of a word, therefore, words like *incontinence* and *immobilization* could be interpreted more easily. Also, the Greek prefix *hyper-* indicates that something is *excessive*, *overmuch*, *exceedingly*, etc., while the Greek prefix *anti-* means *against-*, which should facilitate the interpretation of words such as *hyperthermia* and *hypertension*, or *anti-inflammatory drugs*. We will single out a few incorrect but interesting attempts to interpret the above prefixes, such as *excessive tension/stress*, *severe cramps*, *overactive thyroid i.e. hyperthyroidism,* or drugs *for stomach upset/fever/skin diseases*. The attempts to interpret the word *anamnesis* are also interesting, given that it is used in collocation with the transitive verb *take*, which requires a direct object ("We need to take your *anamnesis (medical history*.") Thus, we got answers like: We need to take your *sample/venous blood sample/sample for a blood count.* Conventionally speaking, when they are unsure about the meaning of a specific medical term, users of healthcare services will try to interpret it according to their knowledge, experience and logical reasoning.

The emergence and availability of the Internet have turned many patients from passive users of medical services into active participants in the medical process [19]. The healthcare system should use the potential of mobile health to engage people in taking active participation in their own health as well as to overcome the barriers faced by patients with low levels of health literacy. Mobile health as a tool for patient empowerment is under-accepted, despite the proven positive effects that mHealth campaigns have had on health behaviors

 ISBN 978-86-7466-969-3

[20]. Encouraging patients with a simple health message before visiting a doctor could motivate patients to talk to their doctors about a relevant health issue, thereby overcoming barriers related to low health literacy. Examples of population health programs based on mobile health technologies are numerous, from text message programs that are focused on public health issues (smoking, obesity, anxiety, etc.), through health reminders to more complex programs that include patient monitoring and care [21]. Text messages can effectively reach a target group, but they must be concise enough to convey the desired information, due to the 160-character limit.

The second part of the questionnaire referred to health habits and the assessment of respondents' willingness to use mobile health technologies. A high percentage of professors reported that they *always* read the instructions for the use of medicine prescribed by a doctor (f. 61.5%/m. 83%), which is another indicator of their adequate health literacy and their need to understand therapeutic indications and actively participate in the treatment. Students do not have an established habit of reading the instructions for the use of medicines, and the largest number of students opted for the mean value - *sometimes* (f. 53%/m. 41.3%) in our survey.

When asked whether they used the electronic media mentioned in the questionnaire (SMS, e-mail, portals, social networks) to communicate with a doctor, the highest percentage of both professors (f. 46.2%/m. 67%) and students (f. 73%/m .57%) stated that they used no medium for online consultations with physicians. Such answers were expected to some extent since in our country there are no healthcare systems that promote the development of eHealth literacy, or digital health as a whole. For electronic communication with physicians, a relatively small percentage of our respondents use SMS (professors: f. 38.5%/m. 0%; students: f. 6%/m. 13%), e-mail (professors: f. 30.8 %/m. 33%; students: f. 6%/m. 5.8%), portals (professors: f.7.7%/m. 0%; students: f.0%/m. 10%) and social networks (professors: f.0%/m. 0%; students: f.13%/m. 1.4%).

When stating the reasons for which they contacted or would contact a physician electronically in the future, professors reported time in the first place (f. 53.8%/m. 83%), then comfort (f. 46.2%/m. 50 %), and a second opinion (f. 30.8%/m. 33%). Students also put the time factor first (f. 40%/m. 64%), followed by seeking a second opinion (f. 53%/m. 21.5%), and comfort was reported in the third place (f. 0%/ m. 14%). Shame, as one of the reasons for electronic communication with physicians, was stated only by a small number of the male student population (2.8%).

With regard to elderly visitors (65+) to the pharmacy, we were interested in their answers to the questions pertaining to health habits and familiarity with electronic communication. All respondents (100%) stated that they never read the instructions for the use of medicines, which could be interpreted as either having extremely high trust in their physicians or they are not used to being actively involved in their treatment. Of all the listed electronic media, 80% of respondents do not use any, while 20% of them stated that they use social networks. As the reason why they would choose to consult a physician online, 20% of respondents stated comfort and 20% of them stated a second opinion.

Unlike the working population, older respondents, i.e. pensioners, do not have a problem with lack of time. Therefore, programs for the use of electronic health applications in order to raise the level of health literacy should be specially adapted to this target group. As eHealth literacy among the elderly is influenced by sociocultural and historical factors, such as old age, the period of Internet expansion and the environment in general, the concept of eHealth literacy should be defined through the evolutionary method proposed by Rogers [25]. eHealth resources are constantly evolving and require continuous user adaptation.

In order to achieve good clinical practice, as well as the promotion and accessibility of health care, it is necessary to ensure professional and effective communication between patients and health professionals. With this research, we would like to point out the importance of improving the health literacy of the population, as poor health literacy represents a significant obstacle to successful communication. It hinders patients' ability to understand written medical information, communicate with healthcare professionals and follow self-care guidelines. Healthcare systems, as well as wider educational systems, should participate in the health education of patients so that they become competent to understand their health conditions and the recommendations of physicians and have the opportunity for critical decision-making regarding their treatment.

In order to better understand the use of electronic media for online consultations with a physician, it is necessary to take into account the fact that it is written, asynchronous communication. Tannen [22] points out that, since written language lacks paralinguistic and kinetic channels available to participants in direct communication, authors of written messages are forced to encode meaning exclusively through lexis and syntax and thus direct readers to the content of the written text. In other words, written language lacks non-verbal communication which makes up almost 90 percent of overall communication. Due to the inability to deliver vocal, facial, gestural and proxemic expression, as the basic modes of non-verbal communication in spoken language, participants in written communication, in our case physicians and patients, are forced to make an extra effort in order to formulate questions and answers precisely, taking into account proper understanding and interpretation of their requests, doubts, advice, recommendations and the like.

During online consultations, regardless of whether they include SMS messages, emails, portals or social networks, participants should make sure that the message is simple and relevant. In direct communication taking place live in the doctor's office, which is not structured and has its own duration, both patients and physicians can apply the four principles of active listening: clarification, paraphrasing, empathy and summarization, and thus ensure a better mutual understanding. In contrast, the asynchronous nature of online consultations with a physician imposes proper and organized linguistic action, and the primary discourse structure of the conversation and the basis of a coherent interaction sequence

 ISBN 978-86-7466-969-3

is usually a two-part exchange of utterances - question/answer.

Successful doctor-patient communication depends on their ability to understand each other. However, doctors are often unaware of the disparity between their way of communicating with patients and the patient's ability to understand, remember and act on the information received [23]. This is evidenced by examples of patients who complain that they do not understand and do not remember what the doctor tells them about the diagnosis and the treatment process, which causes them to be dissatisfied with the health service provided and can have a direct impact on the treatment outcomes. On the other hand, doctors often consciously choose professional jargon, rather than simple, everyday language, because it makes it easier for them to diagnose and give therapeutic recommendations and advice, but at the same time it serves them to maintain their communicative supremacy, control over information and institutional distance between doctors and patients.

IV. Conclusion

Many modern societies impose unhealthy lifestyles, health care systems are increasingly difficult to manage (even for the most educated people), and education systems too often fail to provide people with adequate skills to access, understand, evaluate, and use the information to improve their health. Lower levels of health literacy have been shown to lead to less healthy choices, more risky behaviors, poorer health outcomes, lower levels of self-health management, and more hospitalizations. This affects both human and financial resources in the healthcare system. Addressing the problem of health literacy is a slow process at all levels [24].

It also happens that information published online is misrepresented, which can lead to confusion or misinform the user about the content. When searching for health information, Internet users must have a critical approach in order to determine the accuracy of the information obtained. To enable critical thinking, a certain level of health literacy is required. It is also necessary to point out another aspect of this problem, which refers to the control of published health-related information.

Health literacy is very important especially for patients with more severe illnesses as they must understand complex procedures or treatment options. The potential of mHealth should be used to overcome the obstacles faced by patients with low health literacy. The task for application developers could be to engage users through multimedia: audio, video and interactive graphics. Text-to-speech conversion is a good tool for addressing people with disabilities. Multimedia recommendations, including text-to-speech, would be helpful for people with low health literacy. Studies examining the role of multimedia content have shown a positive effect on the level of patient engagement [26].

Health literacy can be acquired through face-to-face and online environments, which include web portals, social networks and the use of mobile health applications to improve health literacy. It is important to develop mobile applications with the aim of achieving a wide range of user access taking into account the level of health literacy and different cultural and linguistic needs [27].

Literature

[1] G. Eysenbach, "What is e-health?" *J Med Internet Res*, 3, 2001.

[2] M. R. Emerson, S. Buckland, M. A. Lawlor, D. Dinkel, D. J. Johnson, M. S. Mickles, L. Fok, "Addressing and evaluating health literacy in mHealth: a scoping review", *Shinobu Watanabe-Galloway5, mHealth*, 8:33, 2022.

[3] R. Parker, S.C. Ratzan, "Health Literacy: A Second Decade of Distinction for Americans", *Journal of Health Communication*, 15:S2, 20-33, 2010. DOI: 10.1080/10810730.2010.501094.

[4] S. K. Simonds, "Health education as social policy", *Health Education Monograph*, 2, 1–25, 1974.

[5] WHO Commission on the Social Determinants of Health. Achieving health equity: From root causes to fair outcomes. Geneva: World Health Organisation [Online]. 2007. Available from: http://www.who.int/social_determinants/resources/interim_statement/en /in dex.htm

[6] D. Nutbeam, "Health literacy as a public health goal: a challenge for contemporary health education and communication strategies into the 21st century", *Health Promotion International*, Volume 15, Issue 3, pp. 259–267, September 2000. https://doi.org/10.1093/heapro/15.3.259

[7] I. Kickbusch, S. Wait, D. Maag, "Navigating Health. The role of Health Literacy", London: International Longevity Centre – UK, 2006. Available from: https://ilcuk.org.uk/navigating-health-the-role-of-health-literacy/

[8] American medical association. Hidden problem named as national health priority. AMA. [Online]. 2003. Available from: https://www.ama-assn.org/

[9] I. Rootman, B. Ronson, "Literacy and health research in Canada: Where have we been and where should we go?", *Canadian Journal of Public Health*, Suppl. 2:S62-77, 2005.

[10] Health promotion. WHO Global Health Promotion Conferences. 9th Global Conference on Health Promotion, [Online]. Shanghai, 2016. http://www.who.int/healthpromotion/conferences/9gchp/resources/en/

[11] S. Pourrazavi, K. Kouzekanani, S. Bazargan-Hejazi, A. Shaghaghi, M. Hashemiparast, Z. Fathifar, H. Allahverdipour, "Theory-based e-Health literacy interventions in older adults: a systematic review", *Arch Public Health*. 78[1]:1–8, 2020.

[12] C. D. Norman, H. A. Skinner, "eHealth literacy: essential skills for consumer health in a networked world", *J Med Internet Res.* 8[2]:e506, 2006.

[13] C. Norman, "eHealth literacy 2.0: problems and opportunities with an evolving concept" *J Med Internet Res*, 13[4]:e2035. 2011.

[14] K. H. Seo, "The latest global trends in digital health", *Med Policy Forum,* 18[2]:98–103, 2020.

[15] E. Manafò, S. Wong, "Promoting eHealth literacy in older adults: key informant perspectives", *Can J Diet Pract Res*. 74[1]:37–41, 2013.

[16] R. M. Parker, D. W. Baker, M. V. Williams, J. R. Nurss, "The test of functional health literacy in adults: a new instrument for measuring patient's literacy skills", *Journal of General Internal Medicine*, 10(10):537-41, 1995.

[17] L. D. Chew, K. A. Bradley, E. J. Boyko, "Brief Questions to Identify Patients with Inadequate Health Literacy". *Health*. 36(8): 11: 12, 2004.

[18] https://www.ahrq.gov/sites/default/files/wysiwyg/professionals/quality-patient-safety/quality-resources/tools/literacy/sahl-e-form-user-guide.pdf

[19] M. Berger, T. H. Wagner, L.C. Baker, "Internet use and stigmatized illness", Soc Sci Med, Oct;61(8): 1821-1827, 2005.

[20] C. Free, G. Phillips, L. Galli, et al. "The effectiveness of mobile-health technology-based health behaviour change or disease management interventions for health care consumers: a systematic review". *PLoS medicine.* 10:e1001362, 2013

[21] G. Jelić, D. Mamula Tartalja, E. Osmani, "Potencijal SMS komunikacije u mobilnom zdravstvu", Zbornik radova, LXVI konferencija ETRAN, SSDI1.7, 844-848, 2022. ISBN 978-86-7466-930-3

[22] D. Tannen, "Oral and Literate Strategies in Spoken and Written Narratives". *Language*, 58: 1-21. 1982.

[23] D. Schillinger, "Improving Chronic Disease Care for Populations with Limited Health Literacy". In L. Nielsen-Bohlman, A.M. Panzer, D. A. Kindig (Eds.): *Health Literacy: A Prescription to End Confusion*.

Institute of Medicine, The National Academies Press, Washington. pp. 267-284. 2004.

[24] https://apps.who.int/iris/bitstream/handle/10665/128703/e96854.pdf

[25] B. L. Rodgers, "Concept analysis: an evolutionary view", In: *Concept development in nursing: foundations, techniques, and applications*, pp. 77-102, 2000.

[26] K. Elsabrout, "Increasing diabetic patient engagement and self-reported medication adherence using a web-based multimedia program", *J AM Assoc Nurse Pract*, 30: 293-8, 2018.

[27] G. D. Bodie, M. J. Dutta, "Understanding Health Literacy for Strategic Health Marketing: eHealth Literacy, Health Disparities, and the Digital Divide", *Health Marketing Quarterly*, 25 (1-2): 175-203, 2020.

 ISBN 978-86-7466-969-3