ORIGINAL ARTICLE

EXPLORING HEALTH LITERACY OF MEDICAL STUDENTS: A CROSS-SECTIONAL STUDY

P. Pesheva, A. Velkova, L. Georgieva, E. Georgieva, N. Hristov, M. Pravchanska

Department of Social Medicine, Faculty of Public Health „Prof. Tz. Vodenicharov, DSc",
Medical University – Sofia, Bulgaria

Abstract. *New generation of medical students has access to multiple sources of health information of varying quality. This easy access to information sources does not imply definitely that medical students have the necessary skills to understand and judge the adequacy of published health information. Limited research available shows that even among health professionals there are gaps in knowledge, as well as challenges in understanding and assessing capacities related both to individual and environmental health literacy.* **Objective:** *We aimed at exploring the health literacy of medical students and the way they find, understand, appraise and use health information.* **Methods:** *This cross-sectional study was conducted during the 2018/19 academic year at Medical University – Sofia. An adapted and supplemented version of European Health Literacy Survey Questionnaire (EU-HLS-Q) was administered to all 2-nd year medical students who had attended social medicine practical classes (n = 650). Health literacy index (HLI) was calculated. The response rate was 88% (n = 575).* **Results:** *The study found that mean HLI of all participating students was 32.55 falling into the category "problematic". Statistically significant differences were found between Bulgarian and international students in respect to the general HLI, as well as to the many of health related skills and competencies (p < 0.05).* **Conclusion:** *The observed differences were probably due to socially and culturally conditioned factors. However, the main difficulties that all students encountered were in the area of evaluating and judging information relevant to health. Through this study we identified weak areas within the health literacy scope of medical students. The high prevalence of limited health literacy among medical students presents a significant challenge for medical universities. Health literacy resources and competencies should be developed as a life-long continuous process at all levels and kinds of educational institutions including undergraduate medical education.*

INTRODUCTION

Due to its considerable health, social and economic impact health literacy is important for all players in the healthcare system – broader society, users of health care and healthcare providers [1, 2]. In this respect, health literacy is considered to have two components: individual health literacy and environmental health literacy. Individual health literacy involves the skills, knowledge, motivation, and capacity of individuals to find, understand, evaluate, and apply information, and to make effective health

and health care decisions, as well as to take appropriate actions. Environmental health literacy refers to the infrastructure, policies, processes, materials, people, and relationships that affect the way health information is discovered, understood, evaluated, and applied [3].

Health literacy is also identified as a key area of action to achieve global sustainable development goals [4]. Good health literacy contributes to health equity and development of opportunities to achieve good health [5]. At the same time, health literacy is recognized as a critical determinant of health which is able very effectively to influence and control the other determinants of health [6-9].

Within the EU health literacy represents a significant priority, underlining the need to empower patients and establish a culture of patient education and safety in healthcare systems [10]. The results of the European Health Literacy Survey 2012 (HLS-EU) showed that limited health literacy in Europe is not only a problem for minorities, but also a real challenge for the whole EU population. However, limited health literacy represents an important challenge for health policies and practices across Europe, but to a different degree for different countries. The results of the HLS-EU showed that 12% of respondents had insufficient health literacy and 47% of them had limited health literacy [11-13].

Good health literacy is an integral part of the competencies developed over a lifetime mainly through the school and university education. This involves quality education and life-long learning. In this respect, good health literacy skills are essential for medical professionals in order to support informed shared decision-making process of their patients [14-18].

This study aimed at examining the health literacy of medical students in the aspects of finding, understanding, judging and using health information and identifying the weak areas within the health literacy scope.

MATERIALS AND METHODS

Study setting, design and subjects

Social medicine is one of the mandatory courses within the 2-nd year curricula for both Bulgarian and international students at the Medical University of Sofia. The participants in this study were all 2-nd year medical students during the 2018/2019 academic year (n = 650). All of them received a copy of the questionnaire during the social medicine practical classes between October and December 2019. Then students were asked to give their answers in group

settings and they were given 30 minutes to complete the pen-and-paper questionnaire. Five hundred seventy-five (n = 575) responses were obtained and the achieved response rate was 88%. All respondents completed the questionnaire voluntarily after giving their informed consent. Anonymity of participants and confidentiality of the data were ensured.

The study used a cross-sectional design. We created an adapted and supplemented version of European Health Literacy Survey Questionnaire (EU-HLS-Q) which was preliminary tested in a pilot study. The majority of questionnaire items were designed as Likert-like questions: "How easy/difficult would you say it is to" perform a given health related task. Respondents rated their perceived difficulty on a scale with 4 points (very easy, fairly easy, fairly difficult, very difficult). There was an additional option "don't know" for respondent not understanding the questions. We also collected data on demographic characteristics of students, health risks and health status.

Statistical analysis

Descriptive data for categorical variables were presented as number and percentage and mean or median for numerical depending on their distribution. Comparisons between groups were performed using the χ^2 test or Fisher's exact test for nominal variables and the t-test and the Mann–Whitney U-test for scale and ordinal data. Spearman's correlation coefficient was used to evaluate the correlation between variables. P-values of ≤ 0.05 were considered as being statistically significant. Statistical analysis was performed with SPSS version 22.0.

The health literacy index (HLI) providing a general picture of health literacy levels was calculated. The index was measured in scores between 0 and 50 – the higher the score, the higher the level of health literacy. The formula used for calculation of HLI was:

$$(HLI = (mean-1)x(50/3))$$

In this formula, "mean" represented the mean of all participating items for each individual; "1" was the minimal possible value of the mean; "3" was the range of the mean; "50" was the maximum value of the metric [12].

Three threshold values divided the health literacy score into four levels. The first threshold value was set at 25 points and students with a score below this value felt into the category "inadequate" health literacy. The second threshold value was set at 33 points and the third one – at 42 points. The health literacy between 26 and 33 points was qualified as "problematic" and the category between 34 and 42 points was identified as "sufficient". The students that received more than

42 points felt into the category "excellent" health literacy. Limited health literacy combined the categories of "inadequate" and "problematic" health literacy.

RESULTS

Demographic and health characteristics of respondents

In the study participated 215 (37.4%) Bulgarian and 360 (62.6%) international medical students. The percentage distribution of students by country of origin was as follows: Bulgaria – 215 (37,7%), Greece – 150 (25,8%), UK – 58 (10,1%), Germany – 55 (9,6%), Sweden – 14 (2,4%), Pakistan – 13 (2,2%), India -10 (1,7), Italy – 9 (1,6%), Cyprus – 7 (1,2%), other countries (Finland, France, Ireland, Turkey, Russia, USA, Israel, Iraq, Lebanon, Syria, Palestine, Somalia, Japan, China, Sri Lanka, Bangladesh) – 44 (7,6%).

A detailed comparison of both groups by specific demographic and health characteristics is presented in Table 1. The majority of medical students (80.2%) defined their own health as "good" and "very good" and reported never having a long-term illness or health problem (71.6%). We found that mean age (p = 0.000), alcohol use (p = 0.000), and BMI (p = 0.001) were significantly different between the groups of Bulgarian and international students.

Percentage distribution of health literacy items

The answer distributions on the difficulty-easiness of health literacy items presented in Table 2 showed significant variations, ranging from 10.6% (Q8) to 53.7% (Q14) for "very easy" category, and from 1% (Q2) to 15.3% (Q9) for "very difficult" category. Answers from "fairly easy" category ranged between 32.2% (Q9) and 58.0% (Q2) while percentages of "fairly difficult" category ranged be-

Table 1. Demographic and health status data of medical students (n = 575)

Variable	Total (n = 575)		Bulgarian students (n = 215)		International students (n = 360)		P-value
	Case number (n)	Percent (%)	Case number (n)	Percent (%)	Case number (n)	Percent (%)	
Sex							0.130
Female	319	55.5%	128	59.5%	191	53.1%	
Male	256	44.5%	87	40.5%	169	46.9%	
Mean age (years)	20.50		20.07		20.76		0.000
Smoking habits							**0.837**
Smokers	119	20.9%	47	22.2%	72	20.1%	
Ex-smokers	78	13.7%	29	13.7%	49	13.7%	
Non-smokers	373	65.4%	136	64.2%	237	66.2%	
Alcohol use during the last 12 months							0.000
Yes	433	75.3%	186	86.5%	247	68.6%	
No	142	24.7%	29	13.5%	113	31.4%	
BMI							0.001
< 18.49	87	15.1%	43	20.0%	44	12.2%	
18.50-24.99	382	66.4%	152	70.7%	230	63.9%	
25.00-29.99	79	13.7%	17	7.9%	62	17.2%	
> 30.00	27	4.7%	3	1.4%	24	6.7%	
Presence of long-term illness							0.652
No	410	71.6%	149	69.6%	261	72.7%	
One	117	20.4%	48	22.4%	69	19.2%	
More than one	46	8.0%	17	7.9%	29	8.1%	
Visits to the doctor in the last 12 months							0.153
0 times	161	28.1%	53	24.8%	108	30.1%	
1-2 times	292	51.0%	115	53.7%	177	49.3%	
3-5 times	97	16.9%	41	19.2%	56	15.6%	
6 times or more	23	4.0%	5	2.3%	18	5.0%	
Use of electronic apps on mobile phone or other devices to maintain healthy life style							0.187
Yes	253	44.0%	87	40.5%	166	46.1%	
No	322	56.0%	128	59.5%	194	53.9%	
Self-perceived health in general							0.599
Very good	168	29.2%	60	27.9%	108	30.0%	
Good	293	51.0%	117	54.4%	176	48.9%	
Fair	106	18.4%	35	16.3%	71	19.7%	
Bad	8	1.4%	3	1.4%	5	1.4%	
Very bad	0	0.0%	0	0.0%	0	0.0%	

tween 7.3% (Q10) and 33.3% (Q8). There were considerably smaller percentages of answers falling into the "very difficult" category. Only four items from the "don't know" category had response rates higher than 5% (Q8, Q9, Q15, and Q16). The most difficult health literacy competences for medical students were to judge if the information about illness (Q9 = 15.3%) and about health risks (Q16 = 10.1%) in the media was reliable, and to understand information on food packaging (Q17 = 9.9%). On the other hand, understanding health warnings about behavior such as smoking, low physical activity and drinking too much (Q14 = 53.7%), understanding doctor's or pharmacist's instruction on how to take a prescribed medicine (Q7 = 53.0%), and joining a sports club or exercise class (Q21 = 49.7%) were considered one of the easiest health related tasks.

Table 2. Percentage distributions of health literacy items (N = 575)

N/%	How easy/difficult would you say it is:				
	Very easy	Fairly easy	Fairly difficult	Very difficult	Don't know
	N/%	N/%	N/%	N/%	
Q1.To find information about symptoms of illnesses that concern you?	177 / 30.8	327 / 57.0	51 / 8.9	7 / 1.2	12 / 2.1
Q2. To find information about treatments of illnesses that concern you?	113 / 19.7	333 / 58.0	110 / 19.2	6 / 1.0	12 / 2.1
Q3. To find out what to do in case of a medical emergency?	96 / 16.8	279 / 48.7	144 / 25.1	27 / 4.7	27 / 4.7
Q4. To find out where to get professional help (such as doctor, pharmacist, psychologist) when you are ill?	235 / 40.9	229 / 39.9	82 / 14.3	19 / 3.3	9 / 1.6
Q5. To understand what your doctor says to you?	182 / 31.7	285 / 49.6	84 / 14.6	9 / 1.6	15 / 2.6
Q6. To understand the leaflets that come with your medicine?	147 / 25.7	246 / 42.9	121 / 21.1	33 / 5.8	26 / 4.5
Q7. To understand your doctor's or pharmacist's instruction on how to take a prescribed medicine	305 / 53.0	198 / 34.4	50 / 8.7	6 / 1.0	16 / 2.8
Q8. To judge the advantages and disadvantages of different treatment options?	61 / 10.6	244 / 42.6	191 / 33.3	36 / 6.3	41 / 7.2
Q9. To judge if the information about illness in the media (TV, Internet or other media) is reliable?	87 / 15.2	185 / 32.2	177 / 30.8	88 / 15.3	37 / 6.4
Q10. To follow instructions from your doctor or pharmacist?	277 / 48.2	235 / 40.9	42 / 7.3	8 / 1.4	13 / 2.3
Q11. To find information about how to manage unhealthy behaviour such as smoking, low physical activity and drinking too much?	237 / 41.2	217 / 37.7	81 / 14.1	13 / 2.3	27 / 4.7
Q12. To find information about vaccinations and health screenings that you should have?	117 / 20.4	219 / 38.2	172 / 30.0	39 / 6.8	27 / 4.7
Q13. To find information on how to prevent or manage conditions like being overweight, high blood pressure or high cholesterol?	215 / 37.4	258 / 44.9	72 / 12.5	12 / 2.1	18 / 3.1
Q14. To understand health warnings about behaviour such as smoking, low physical activity and drinking too much?	309/ 53.7	199 / 34.6	46 / 8.0	13 / 2.3	8 / 1.4
Q15. To judge how reliable health warnings are, such as smoking, low physical activity and drinking too much?	197 / 34.3	245 / 42.6	84 / 14.6	18 / 3.1	31 / 5.4
Q16. To judge if the information on health risks in the media (TV, Internet or other media) is reliable?	106 / 18.5	191 / 33.3	184 / 32.1	58 / 10.1	34 / 5.9
Q17. To understand information on food packaging?	133 / 23.2	231 / 40.3	137 / 23.9	57 / 9.9	15 / 2.6
Q18. To understand information in the media (Internet, newspapers, magazines) on how to get healthier?	193 / 33.7	255 / 44.5	79 / 13.8	27 / 4.7	19 / 3.3
Q19. To judge which everyday behaviour (drinking and eating habits, exercise etc.) is related to your health?	243 42.5	233 / 40.7	74 / 12.9	8 / 1.4	14 / 2.4
Q20. To judge how your housing conditions help you to stay healthy?	186 / 32.4	267 / 46.5	88 / 15.3	17 / 3.0	16 / 2.8
Q21. To join a sports club or exercise class if you want to?	286 / 49.7	190 / 33.0	78 / 13.6	14 / 2.4	7 / 1.2
Q22. To influence your living conditions that affect your health and well-being? (Drinking and eating habits, exercise etc.)	178 / 31.0	260 / 45.2	198 / 23.8	21 / 3.7	7 / 1.2

No gender differences were found in respect to the single health literacy items. At the same time, most of the single health literacy items showed significant differences between Bulgarian and international students in perceived difficulty/ease: finding information about symptoms (p = 0.005) and treatments of illnesses (p = 0.003); finding out what to do in case of a medical emergency (p = 0.005); understanding what doctor says (p = 0.000) and doctor's or pharmacist's instruction on how to take a prescribed medicine (p = 0.000); understanding the leaflets that come with medicine (p = 0.000); following instructions from doctor or pharmacist (p = 0.000); finding information about vaccinations and health screenings (p = 0.029); understanding health warnings about behaviour such as smoking, low physical activity and drinking too much (p = 0.004); judging the reliability of health warnings (p = 0.004) and the reliability of the information on health risks in the media (p = 0.003); understanding information on food packaging (p = 0.03); judging which everyday behaviour is related to health (p = 0.000).

Health literacy index (HLI)

Means, standard deviations and percentiles of general HLI are presented in Table 3. The general HLI for total of respondents was 32.55, 95CI [31.894–33.206] falling into the category "problematic".

**Table 3.** Means and Standard Deviations (SD) of HLI

	All students
Mean	32.55
Std. Deviation (SD)	8.02
95% Confidence Interval (95%CI)	± 0.656
Percentiles	
25	28.03
50	33.33
75	37.88

As shown in Table 4 the Bulgarian students were significantly different from international students on general HLI (p = 0.000). The average HLI score of international students (M = 31.53) was significantly lower than the HLI score of Bulgarian students (M = 34.25). The difference was 2.72 points on the 50-point scale. The effect size d was 0.36, which is a medium effect size. Gender showed no significant difference on the general HLI (p = 0.92) with very small effect size (d = 0.01).

Figure 1 demonstrates that limited health literacy could be considered an important issue among medical students. About 13.9% of all respondents showed inadequate HL and more than one third of them (33.6%) had problematic health literacy, thus nearly

Table 4. Comparison of HLI on students' origin and gender

Variable	M	SD	95%CI	t	df	p	d
HLI				3.99	573	0.000	0.36
Bulgarian students	34.25	6.13	± 0.819				
International students	31.53	8.81	± 0.910				
HLI				0.10	573	0.92	0.01
Females	32.58	7.81	± 0.857				
Males	32.51	8.28	± 1.014				
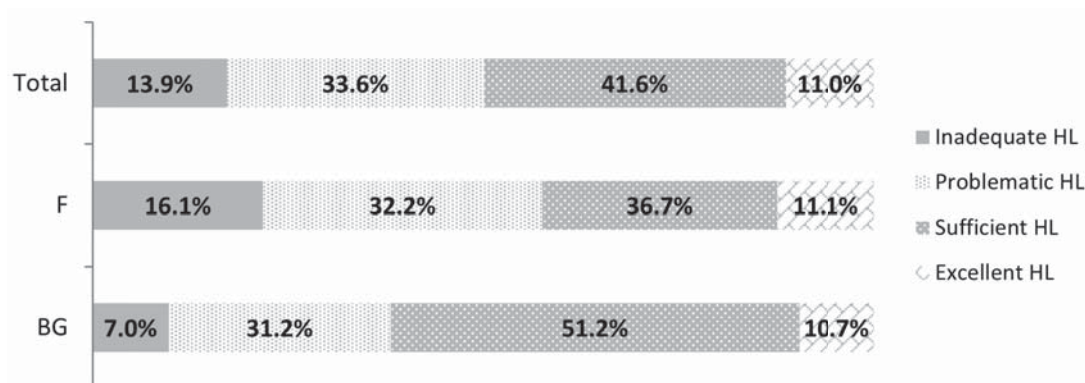
Fig. 1. Percentage distribution of general HLI (total, foreign F and Bulgarian BG students)

every second medical student (47.5%) demonstrated limited health literacy. However, the percentages varied between the Bulgarian and international medical students – 16.1% of foreign and 7.0% of Bulgarian respondents showed inadequate health literacy. More than one third of them – 32.2% of foreign and 31.2% of Bulgarian students – had problematic health literacy. The percentages of respondents with "sufficient" HL also varied considerably, namely 36.7% of foreign and 51.2% of Bulgarian students. Respectively 11% of all respondent were classified as having excellent HL, as well as 11.1% of foreign and 10.7% of Bulgarian students.

The very good health had doubled with the increase of the level of health literacy from 21.3% in the lowest health literacy level to 42.9% in the highest health literacy level (Figure 2). There was also small and steady increase in good health between the inadequate (50%), problematic (52.8%) and sufficient health literacy categories (53.1%).

The study explored several health behaviors in association with the general HLI (Spearman's Rho). The bivariate correlation analysis found mainly weak to no relationships between these variables and HLI. The general HLI was significantly correlated with self-perceived health ($r_s = 0.123$, $p = 0.003$), the presence of long-term illness ($r = 0.097$, $p = 0.021$), the tobacco products use ($r_s = -0.096$, $p = 0.048$) and the alcohol use ($r_s = -0.093$, $p = 0.026$). Statistically significant associations were found between self-perceived health and presence of one or more long-term illnesses ($r_s = -0.367$, $p = 0.000$) as well as between the smoking status and the presence of long-term illnesses ($r_s = -0.208$, $p = 0.002$).

DISCUSSION

Modern health systems and related health information have become increasingly complex and harder to understand. In this respect health literacy is crucial in the effective communication between patients and health professionals [19, 20].

Health literacy influences health outcomes in a negative or positive way depending on its level and development. Many studies show that the lower levels of health literacy have a significant impact on both individual and public health. Limited health literacy is associated with adverse health outcome and co-morbidities, poor access to health care, including differential use of certain health care services – higher utilization of treatment services, limited use of preventive services, ineffective management of chronic diseases, increased hospital admissions and read-missions, increased emergency care utilization [21-29]. People with low health literacy skills have poorer health-related knowledge and comprehension including a poorer ability to comply with treatment regimen and take medications properly and to interpret medication labels and health messages [30]. Health literacy affects the way patients communicate with doctors and poor communication between them is associated with higher rates of medical errors and non-compliance [31]. Low health literacy also means poor individual choice in health decision making and is associated with, higher risk of morbidity and premature death [32].

Studies on the health literacy of health professionals, including medical students are limited. These limited researches show that even among health professionals there are gaps in knowledge, as well as limitations in understanding and assessing capacities related both to individual and to environmental health literacy. Health professionals have limited awareness and knowledge of health literacy and its impact on the well-being of their patients [33].

Although as future health professional medical students will be a source of health-related information for their patients, they are also users of health-relat-
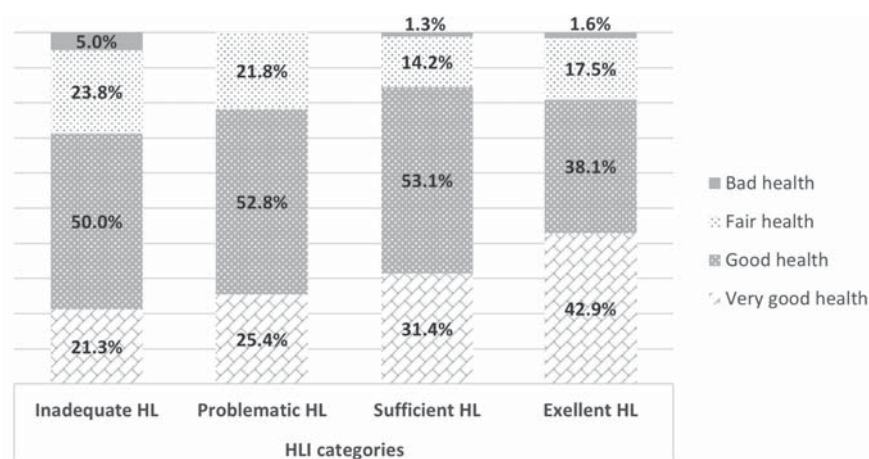

Fig. 2. Self-perceived health by HLI

ed information and need to be health literate themselves. Several studies show that health literacy of medical students is not as high as expected and that limited health literacy represents a problem for them. These studies also emphasize the need of support and improvement in health literacy related skills of medical students [14-18].

New generation of medical students has access to multiple sources of health information of varying quality. The information that could be found on internet often is influenced by vested interests and the extensive amount of it could be perceived more as overwhelming than as helpful. The easy access to information sources does not imply definitely that medical students have the necessary skills to understand and judge the adequacy of published health information. In this respect, medical students need to develop skills and competencies required for critical appraisal of published health related information in order to be able to assess its directness, validity, reliability, and applicability. On the other hand, the acquisition of health knowledge, skills and competencies without being accompanied by strong motivation and adequate health behavior would not lead to the expected health outcomes.

This study showed that the health literacy of medical students from Medical University – Sofia was not as good as expected and needs to be developed and improved in some of its most important aspects. The high proportion of medical students with inadequate and problematic health literacy poses a specific challenge for the medical university and requires adequate educational activities with an emphasis on the development of health literacy related competencies. However, the observed differences between Bulgarian and international medical students could be due to the socially and culturally conditioned factors that need to be explored. Low health literacy levels could not be attributed only to the lack of knowledge, competence, skills or motivation; they are closely related to the social circumstances of people. The differences could also partly be attributed to the difficulties that foreign students encounter when navigating through the sophisticated Bulgarian health care system. In this respect, the healthcare system itself should be made more health literate and user-friendly in order to reduce informational challenges that users face.

This study has several limitations. The self-experienced and self-rated nature of questionnaire items enable the respondents to exaggerate their own competencies to find, judge and apply reliable health-related information which again could be attributed to some cultural characteristics. Social, economic and cultural characteristics of respondents need to be in-

vestigated in more detail to provide information about socially conditioned differences in health literacy.

CONCLUSION

It is important to understand that health literacy is not isolated phenomenon and it is shaped by everyday life and environmental conditions over the whole life cycle. Limited health literacy is a personal, institutional and public health problem. The prevalence of limited health literacy among medical students is a challenge for educational institutions operating at all levels and especially for medical universities. Health literacy resources and competencies need to be developed as a life-long continuous process at all levels and kinds of educational institutions including undergraduate medical education.

REFERENCES

1. World Health Organization. Health promotion glossary of terms 2021 [Internet]. Geneva: World Health Organization; 2021 [cited 2022/01/25]. Available from: https://www.who.int/publications/i/item/9789240038349.

2. Dodson S, Good S, Osborne RH. Health literacy toolkit for low and middle-income countries: a series of information sheets to empower communities and strengthen health systems. New Delhi, India: World Health Organization, Regional Office for South-East Asia; 2015.

3. Australian Commission on Safety and Quality in Health Care. Health literacy: Taking action to improve safety and quality. Sydney, Australia: ACSQHC: 2014.

4. Menabde N. Health literacy and the SDGs [Internet]. United Nations Association–UK; 2016 Mar 26 [cited 2021 Oct 3]. Available from: https://www.sustainablegoals.org.uk/health-literacy-and-the-sdgs.

5. Public Health England. Local action on health inequalities. Improving health literacy to reduce health inequalities. Practice resource: Sept. 2015. [Internet]. [cited 2021 May 24] https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/460709/4a_Health_Literacy-Full.pdf.

6. Sorensen K, Van den Broucke S, Fullam J, et al. Health literacy and public health: a systematic review and integration of definitions and models. BMC Public Health. 2012; 12:80.

7. Murthy P. Health Literacy and Sustainable Development. UN Chronicle. [cited 2021 March 29] https://www.un.org/en/chronicle/article/health-literacy-and-sustainable-development. Updated January 2021.

8. De Andrade LOM, Filho AP, Solar O, et al. Social determinants of health, universal health coverage, and sustainable development: Case studies from Latin American countries. Lancet. 2015; 385(9975):1343-51.

9. World Health Organization, United Nations Development Program. Health literacy. In: Policy brief 4: Proceedings of 9th Global Conference on Health Promotion 2016. Geneva, Switzerland: World Health Organization, 2016;1-9.

10. Commission of the European Communities, Together for Health: A Strategic Approach for the EU 2008-2013, 2007. [cited 2021 Oct. 25] http://ec.europa.eu/health/ph_overview/strategy/health_strategy_en.htm.

11. Petrova-Gotova T. Health literacy, poverty and population health – link, social and economical consequences. Scs& Techs, 2013; 254(1):346-350.

12. Pelikan J, Rotlin F, Ganahl K. Comparative report of health literacy in eight EU member states: The European health literacy survey HLS-EU 2012. HLS-EU Consortium, http://www.health-literacy.eu. Published 2013. Accessed March 5, 2019.

13. Sorensen K, Pelikan J, Rotlin F, et al. Health literacy in Europe: comparative results of the European health literacy survey (HLS-EU). Eur J Public Health. 2015;25(6):1053–1058.

14. Pesheva P, Velkova A, Georgieva L, et al. Functional health literacy of students of the Medical university – Sofia. Trak J Scs. 2018; 16:55-59.

15. Zhang Y, Zhang F, Hu P, et al. Exploring Health Literacy in Medical University Students of Chongqing, China: A Cross-Sectional Study. PLoS One. 2016;11(4):e0152547.

16. Zou M, Zhang Y, Zhang F, et al. The ability to obtain, appraise and understand health information among undergraduate nursing students in a medical university in Chongqing, China. Nurs Open. 2018;5(3):384-392.

17. Rong H, Cheng X, Garcia JM, et al. Survey of health literacy level and related influencing factors in military college students in Chongqing, China: A cross- sectional analysis. PLoS ONE. 2017;12(5): e0177776.

18. Vamos S, Yeung P, Bruckermann T, et al. Exploring health literacy profiles of Texas university students. Health Behav Policy Rev. 2016; 33:209–25.

19. Parker R. Measuring health literacy: Why? So what? Now what? In: Hernandez L, ed. Measures of Health Literacy: Roundtable on Health Literacy. Washington, USA: National Academies Press; 2009;91–98.

20. Sørensen K, Pelikan JM, Röthlin F, et al. HLS-EU Consortium. Health literacy in Europe: comparative results of the European health literacy survey (HLS-EU). Eur J Public Health. 2015; 25(6):1053-8.

21. Sudore RL, Mehta KM, Simonsick EM, et al. Limited literacy in older people and disparities in health and healthcare access. J Am Geriatr Soc. 2006;54(5):770-6.

22. Levy H, Janke A. Health Literacy and Access to Care. J Health Commun. 2016;21 Suppl 1(Suppl):43-50.

23. Vandenbosch J, Van den Broucke S, Vancorenland S, et al. Health literacy and the use of healthcare services in Belgium. J Epidemiol Community Health. 2016; 70:1032-1038.

24. Bennett IM, Chen J, Soroui JS, White S. The contribution of health literacy to disparities in self-rated health status and preventive health behaviors in older adults. Ann Fam Med. 2009; 7:204-11.

25. White S, Chen J, Atchison R. Relationship of preventive health practices and health literacy: a national study. Am J Health Behav. 2008; 32:227-42.

26. Poureslami I, Nimmon L, Rootman I, Fitzgerald MJ. Health literacy and chronic disease management: drawing from expert knowledge to set an agenda. Health Promot Int. 2017;32(4):743-754.

27. Smith S, McCaffery K. Health Literature: a brief literature review. NSW Clinical Excellence Commission Australia. [cited 2021 Dec. 12] https://www.balid.org.uk/wp-content/uploads/2012/10/Health-Literacy-a-brief-literature-review.-Sian-Smith-Dr-Kirsten-McCaffery-University-of-Sydney-2012-NSW-Clinical-Excellence-Commission-Australia.pdf. Published 2010.

28. Jessup RL, Osborne RH, Beauchamp A, et al. Health literacy of recently hospitalised patients: a cross-sectional survey using the Health Literacy Questionnaire (HLQ). BMC Health Serv Res. 2017;17(1):52.

29. Griffey RT, Kennedy SK, D'Agostino McGowan L, et al. Is low health literacy associated with increased emergency department utilization and recidivism? Acad Emerg Med. 2014;21(10):1109-15.

30. Berkman N, Sheridan S, Donahue K, et al. Low Health Literacy and Health Outcomes: An Updated Systematic Review. Ann Intern Med. 2011;155(2):97-107.

31. Kripalani S, Jacobson TA, Mugalla IC, et al. Health literacy and the quality of physician-patient communication during hospitalization. J Hosp Med. 2010;5(5):269-75.

32. Vernon J A, Trujillo A, Rosenbaum S, DeBuono B. Low health literacy: Implications for national health policy. Research Report. Washington, Department of Health Policy, School of Public Health and Health Services, The George Washington University. 2007, [cited 2021 Dec. 9] https://hsrc.himmelfarb.gwu.edu/sphhs_policy_facpubs/172/.

33. Güner MD, Ekmekci PE. A Survey Study Evaluating and Comparing the Health Literacy Knowledge and Communication Skills Used by Nurses and Physicians. Inquiry. 2019; 56:46958019865831.

P. Pesheva, A. Velkova, L. Georgieva et al.