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The level of health literacy of students at medical faculties

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ABSTRACT

Introduction: Health literacy (HL) is a key concept for interventions that aim at improving the health of individuals and populations, but it is also a way to improve the health care system, especially in the field of interaction between healthcare providers and patients. The aim of the study was to determine the level of health literacy among students of medical faculties.

Methods: A cross-sectional study was realized at three faculties of medicine in the academic year 2015/2016. In the study there were 390 students of medicine (male 41.5%, Slovak students 50.1%) with an average age of 23 ($SD = 3$). We administered the health literacy questionnaire (HLQ) with items including school characteristics and health status. We tested associations between HL and sex, year of study, study and health status with Pearson χ^2 test in statistical program SPSS 21.0

Results: The surveyed students more often had an optimal HL, with deficiencies in the appraisal of health information and the ability to actively cooperate with healthcare (HC) providers. Women more often had the deficiency of HL in cooperation with HC providers and navigation in the HC system. Students of the first to third grade of study had a more frequent deficiency of HL in information to manage health and understanding the health information (compared with higher year of study). Foreign students more often had an optimal level of HL in social support in health, cooperation with HC providers and in navigating the HC system. Health respondents more often had a deficiency of HL in understanding health information when compared to students who had a chronic disease/health complications.

Conclusion: We found that students of medical faculties demonstrate a lack of HL, which is mainly related to the ability to cooperate with HC providers, to assess and understand health information, but also to navigate the HC system. On the basis of our findings, we will be able to develop an appropriate intervention to improve HL in a targeted group of medical faculty students.

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Introduction

The increasing number of scientific work has proved that the issue of health literacy is receiving attention in the field of sciences and in numerous political and research programmes of world importance.

The main idea of health literacy is to understand the value of health, to take an active interest in health issues, take responsibility for it and to be properly informed about the system of health care. This understanding develops ones ability to make proper decisions in maintaining better health conditions [1–3]. At the same time, it is used as a key word for solving global health problems [4, 5]. There are many definitions in existence relating to health literacy (HL). However, the WHO's definitions prevails. The WHO [6] defines health literacy as: *“cognitive and social abilities which determines individual motivations and the ability to have access to, understand and use information about health in a way that supports good health conditions and supports them”*. This means the ability of a person to search, understand and use information about health and health services for ones own benefit. The majority population, regardless of educational background, have difficulties navigating the system of health care, to understand health information and to actively co-operate with a health care provider [7, 8]. Extensive international publications about health literacy claim that neither higher education, medical education nor the age factor guarantee the applying of knowledge about health literacy in exact situations [9]. Moreover, further experiments have proven that a population with a low degree of health literacy has a higher mortality and sickness rate, and does not pay much attention to preventive check-ups and hospitalization [10–13]. The importance of health literacy that affects patients, students, and citizens who are not medical workers has been monitored in many countries.

Proper health literacy plays an important role in effective communication between patients and medical workers. International research implies that there are remarkable gaps in the understanding of, knowledge about, and clinical recognition of health literacy [14]. Nowadays, compared to other countries of the EU, Slovakia has a low degree in health efficiency. One of the main reasons is the shorter healthy life years of Slovakia citizens – 52.2 on average, compared to 62 years in EU citizens [15].

Therefore, in this research we are focusing on students of medical and related fields of studies as they need considerable attention in getting a high degree of health literacy – as after graduation there is the possibility of them working in the medical field. Deficient knowledge about health literacy negatively affects their skills in providing health care to patients, communication skills and the overall healthcare providing process [16, 17].

As the medical students are our future health care providers and key players, effort has to be taken to improve medical students' health literacy and thus improve the response of future health care providers. Of course, a high degree of HL providers, future providers of HC and medical graduates is required. The aim of this work is to focus

on monitoring the degree of health literacy of medical students using HLQ questionnaire. We also compared the HL degree in groups of respondents who were arranged by gender, school characteristic, and the presence of long term illnesses/disease.

Materials and methods

Procedure

A cross-sectional questionnaire survey was conducted from November 2014 to May 2016. We used the Slovak version of the Health Literacy Questionnaire (HLQ™), translated and adapted in collaboration with Prof. Richard Osborne and his team (Deakin University in Melbourne, Australia) according to research requirements in a group of medical students in Slovakia [18, 19].

The questionnaires were distributed to medical students (general medicine and dental medicine), and non-medical (nursing, physiotherapy and public health) at Slovak medical faculties (Pavol Jozef Šafárik University in Košice 53.7%, Comenius University Jessenius Faculty of Medicine in Martin 6.1%, and Comenius University in Bratislava 39.9%). We distributed an online as well as a printed form of a Health literacy questionnaire, along with items that included the school context and the health of students. The study was approved by the Ethical Committee of the Faculty of Medicine, P. J. Šafárik University (The ethical approval was obtained on November 29, 2013).

Sample

Questionnaires were completed by 390 Slovak and foreign students of medicine and related fields of studies (males 41.8%, Slovak students 50.1%). Of the 700 questionnaires distributed to students, 53% were returned. Mean age of the sample was 23 years ($SD = 3$). There was unequal distribution of the respondents according to study programme (only 22 respondents from non-medical fields of studies took part in the research). These respondents were included in the total set of the faculty of medical students.

Data were collected using a battery of questionnaires consisting of the sociodemographic and academic background (e.g. gender, age, year of study, type of student), the Health literacy questionnaire (HLQ), and health status. We used the Slovak version HLQ-SK for Slovak students (SS), the original HLQ version which was used for foreign student (FS) study in the English programme. The research, which examined the psychometric properties of the HLQ questionnaire in Slovakia, confirms the adequacy of the psychometric properties of the Slovak version of HLQ with the original version of HLQ [19, 20]. The English version HLQ for foreign students were completed with items mapping demographic, school characteristics and health.

The Health literacy questionnaire (HLQ) is a multi-dimensional measuring tool and comprises nine different domains of HL to provide a detailed profile of HL in specific populations. The domains of HLQ are as follows:

- HLQ1 Feeling understood and supported by healthcare providers
- HLQ2 Having sufficient information to manage my health
- HLQ3 Actively managing my health
- HLQ4 Social support for health
- HLQ5 Appraisal of health information
- HLQ6 Ability to actively engage with healthcare providers
- HLQ7 Navigating the healthcare system
- HLQ8 Ability to find good health information
- HLQ9 Understanding health information well enough to know what to do

The Health literacy questionnaire, HLQ, is divided into two parts which differ in response categories. In the first part, respondents comment on how far they agree or disagree with the group of statements. In the second part, the respondents decided how difficult or easy it is to perform certain tasks. Part one (domains 1–5) contains the following response categories: *Cannot do* (1), *Very difficult* (2), *Quite difficult* (3), *Quite easy* (4) and *Very easy* (5). Part two (domains 1–5) contains these response categories: *Cannot do or always difficult* (1), *Usually difficult* (2), *Sometimes difficult* (3), *Usually easy* (4) and *Always easy* (5).

School characteristics: Respondents were asked about the year of study in their study programme and the category of student. According to the grade of study, respondents were grouped into: the first to third/fourth to sixth. The category of the type of student was also included: Slovak student (SS) / foreign student (FS).

In addition to these variables, we asked for the presence of *long term health condition, chronic disease or health complications*. We divided the students into two groups: without chronic disease or with long term chronic disease/chronic disease or health complications.

We divided respondents with optimal HL and deficient HL. For that reason, we composed a formula for each particular domain with a scale from 0 to 100. This scale showed the proportion of domains with a score under 50. Respondents with a score of under 50 used mostly the response categories of strongly disagree/disagree or cannot do/usually difficult in HLQ domains. Respondents who had a score of above 50 mostly answered with strongly agree/agree or can do/usually easily. Respondents who scored below 50 were labelled as students with deficient HL, and those with a score of above 50 were labelled as having optimal HL. Afterwards, we described the formula for HL evaluation.

$HLQ = (100 / \text{maximum value per domain}) * (HLQ \text{ summary score for domain} - \text{minimum value per domain}):$

$$HLQ1 = (100/16) * (\text{score HLQ1} - 4)$$

$$HLQ2 = (100/16) * (\text{score HLQ2} - 4)$$

$$HLQ3 = (100/20) * (\text{score HLQ3} - 5)$$

$$HLQ4 = (100/20) * (\text{score HLQ4} - 5)$$

$$HLQ5 = (100/20) * (\text{score HLQ5} - 5)$$

$$HLQ6 = (100/25) * (\text{score HLQ6} - 5)$$

$$HLQ7 = (100/30) * (\text{score HLQ7} - 5)$$

$$HLQ8 = (100/25) * (\text{score HLQ8} - 5)$$

$$HLQ9 = (100/25) * (\text{score HLQ9} - 5)$$

Data analysis

Statistical analyses were performed using IBM SPSS 21.0 and Excel 2016. Gender differences in selected indicators of the school context, health, and domain of HLQ were explored using chi square.

Results

Description of the student sample stratified by gender is provided in Table 1. The study sample attended the following grades of study: 1–3 year in a similar representation of men as well as women (men/women: 48.6% / 50.3%). Women more often attended 4–6 year of study (64.2%) compared with men (35.8%). In the subsample of Slovak students the proportion of female respondents was higher compared to the male respondents (women/men: 66.1% / 30.1%). On the other hand, there were a higher percentage of men among the foreign students (men/women: 69.9% / 33.9%). Regarding the health conditions of the students, 48% percent of students reported one or more chronic diseases, and women tended to have more chronic health conditions compared to men (men/women: 36.2% / 57.7%). Table 1 presents the prevalence of chronic disease and health complications. Headaches (total prevalence = 32.8%; men/women: 19.6% / 42.7%) and back pain (total prevalence = 9.9%; men/women: 8.6% / 11.0%) are the most prevalent symptoms.

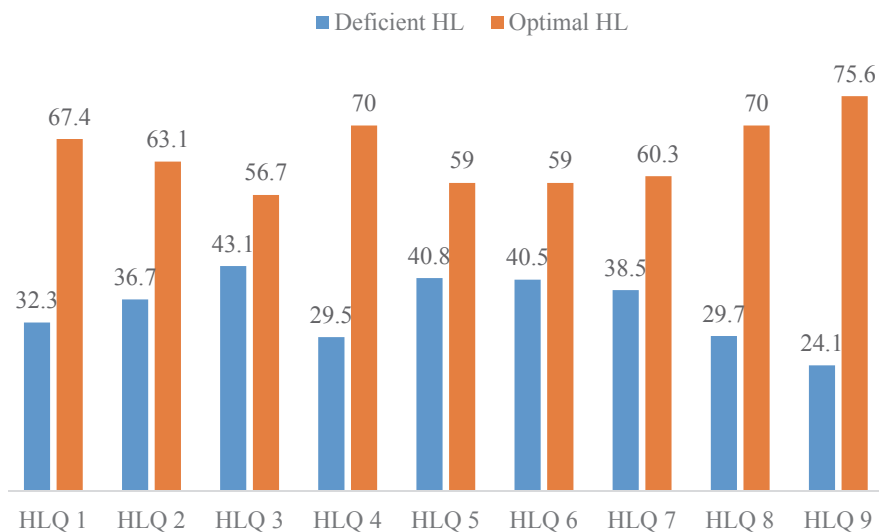
Table 1 – Descriptive statistics of medical students and students of related fields of study

	Study			
	Men		Women	
	<i>n</i>	%	<i>n</i>	%
1st–3rd year	84	48.6	87	50.3
4th–6th year	78	35.8	140	64.2
Total	162	41.8	227	57.8
Type of student				
Slovak student (SS)	49	30.1	150	66.1
Foreign student (FS)	114	69.9	77	33.9
Health condition				
Healthy	90	55.2	86	37.9
With chronic disease	59	36.2	131	57.7
Headache	32	19.6	97	42.7
Back pain	14	8.6	25	11.0
Depression or anxiety	9	5.5	17	7.5
Asthma	7	4.3	8	3.5
Hypertension	6	3.7	3	1.3
Diabetes mellitus	3	1.8	5	2.2
Arthritis	2	1.2	0	0.0
Cancer	0	0.0	4	1.8
Stroke	0	0.0	1	0.4
Atherosclerosis	0	0.0	0	0.0

Chart 1 and Table 2 present a description of gender differences between the domains and the level of health literacy among students. Respondents more often had optimal health literacy, which was over 50% in all domains (Chart 1).

Students had higher scores of HL in the domains of: HLQ4 – Social support for health (70%), HLQ8 – Ability to find good health information (70%), and HLQ9 – Understanding health information well enough to know

what to do (75.6%). The students had *deficiency of health literacy* in the domains of: HLQ5 – Appraisal of health information (40.8%), and HLQ6 – Ability to actively engage with healthcare providers (40.5%).



The HLQ domains: HLQ1 Feeling understood and supported by healthcare providers; HLQ2 Have sufficient information to manage health; HLQ3 Actively managing my health; HLQ4 Social support for health; HLQ5 Appraisal of health information; HLQ6 Ability to actively engage with healthcare providers; HLQ7 Navigating the healthcare system; HLQ8 Ability to find good health information; HLQ9 Understanding health information well enough to know what to do.

Chart 1 – The level of HL in medical students and students of related fields of study

Table 2 shows gender differences between HL and sex, year of study, type of student and health status: chronic disease / health complications. We found that compared with men, women more often had the *deficiency of health literacy* in domains HLQ6 – Ability to actively engage with healthcare providers and HLQ7 – Navigating the healthcare system (HLQ6 – men/women: 32.5% / 46.3%, HLQ7 – men/women: 28.8% / 45.4%). Students who attended 1–3 year more often had *deficient HL* in HLQ2 – Have sufficient information to manage health and HLQ9 – Understanding health information well enough to know what to do (compared with higher level study 4–6 year) (HLQ2 – 1–3 year / 4–6 year: 43.9% / 31.2 %, HLQ9 – 1–3 year / 4–6 year: 29.8% / 20.2%). Slovak students more often had the *deficiency of HL* in: HLQ4 – Social support for health, HLQ6 – Ability to actively engage with healthcare providers, and HLQ7 Navigating the healthcare system compared with foreign students (HLQ4 – Slovak s. / foreign s: 34.7% / 24.4%, HLQ6 – Slovak s. / foreign s.: 48.2% / 32.1%, HLQ7 – Slovak s. / foreign s: 44.7% / 31.6%). Respondents without chronic disease and health complications more often had the *deficient HL* in: HLQ9 – Understanding health information well enough to know what to do, to such an extent that an individual knows what to do compared with the healthy group (HLQ9 – chronic disease, health complications / healthy group: 20% / 29.6%).

Discussion

The main interest of this paper was to evaluate the level of HL in medical students and students of related fields of study. Since this problematic has not been studied sufficiently we used HLQ questionnaire. We can state that more than 50% of respondents had optimal knowledge of health literacy. The highest levels were ascertained in skills such as: searching information about health and understanding health related information. A higher level of health literacy was more prevalent among respondents studying in the higher grades. [9, 21]. This finding contrasts with a smaller Slovak study among the general adult population, where a difference in HL according to age was reported only in one domain [19]. But those findings are in line with the population-based survey, realized in the Czech Republic in 2014, during the implementation of the programme “Health 2020 in Czech Republic”. These results were associated with a European health literacy survey (HLS – EU) realized in 8 countries of the EU (Austria, Germany, Netherlands, Ireland, Greece, Spain, Poland, Bulgaria), which showed that age factor and educational degree has an impact on health literacy [22]. In this survey, health literacy was associated negatively with age factor and positively with educational degree [22, 23]. The survey

Table 2 – Gender differences between domains and level of health literacy (χ^2)

	HLQ 1 Feeling understood and supported by healthcare providers		HLQ 2 Have sufficient information to manage health		HLQ 3 Actively managing my health		HLQ 4 Social support for health		HLQ 5 Appraisal of health information		HLQ 6 Ability to actively engage with healthcare providers		HLQ 7 Navigating the healthcare system		HLQ 8 Ability to find good health information		HLQ 9 Understanding health information well enough to know what to do	
	n (%)	n (%)	n (%)	n (%)	n (%)	n (%)	n (%)	n (%)	n (%)	n (%)	n (%)	n (%)	n (%)	n (%)	n (%)	n (%)	n (%)	n (%)
Gender	Men	Women	Men	Women	Men	Women	Men	Women	Men	Women	Men	Women	Men	Women	Men	Women	Men	Women
Deficient HL	57 (35.0)	69 (30.4)	56 (34.4)	87 (38.3)	63 (38.7)	105 (46.3)	51 (31.3)	64 (28.2)	66 (40.5)	93 (41.0)	53 (32.5)	105 (46.3)	47 (28.8)	103 (45.4)	48 (29.4)	68 (30.0)	43 (26.4)	51 (22.5)
Optimal HL	105 (64.4)	158 (69.6)	106 (65.0)	140 (61.7)	99 (60.7)	122 (53.7)	111 (68.1)	162 (71.4)	97 (59.5)	133 (58.6)	110 (67.5)	120 (52.9)	113 (69.3)	122 (53.7)	115 (70.6)	158 (69.6)	119 (73.0)	176 (77.5)
Chi-square	0.19		0.26		0.09		0.28		0.49		0.00 ^c		0.00 ^c		0.49		0.21	
Study																		
Years	1-3	4-6	1-3	4-6	1-3	4-6	1-3	4-6	1-3	4-6	1-3	4-6	1-3	4-6	1-3	4-6	1-3	4-6
Deficient HL	59 (34.1)	68 (31.2)	76 (43.9)	68 (31.2)	70 (40.5)	99 (45.4)	45 (26.0)	71 (32.6)	77 (44.5)	83 (38.1)	67 (38.7)	91 (41.7)	63 (36.4)	87 (39.9)	55 (31.8)	61 (28.0)	51 (29.8)	44 (20.2)
Optimal HL	113 (65.3)	150 (68.8)	96 (55.5)	150 (68.8)	102 (59.0)	119 (54.6)	126 (72.8)	147 (67.4)	96 (55.5)	134 (61.5)	106 (61.3)	125 (57.3)	108 (62.4)	128 (58.7)	118 (68.2)	156 (71.6)	121 (69.9)	174 (79.8)
Chi-square	0.29		0.01 ^b		0.20		0.11		0.13		0.28		0.27		0.25		0.02 ^a	
Typ of student																		
SS	FS	FS	SS	FS	SS	FS	SS	FS	SS	FS	SS	FS	SS	FS	SS	FS	SS	FS
Deficient HL	64 (32.2)	63 (32.6)	76 (38.2)	68 (35.2)	93 (46.7)	76 (39.4)	69 (34.7)	47 (24.4)	86 (43.2)	74 (38.3)	96 (48.2)	62 (32.1)	89 (44.7)	61 (31.6)	62 (31.2)	54 (28.0)	42 (21.1)	53 (27.5)
Optimal HL	135 (67.8)	129 (66.8)	126 (61.8)	124 (64.2)	106 (53.3)	116 (60.1)	130 (65.3)	144 (74.6)	112 (56.3)	119 (61.7)	101 (50.8)	131 (67.9)	107 (53.8)	130 (67.4)	136 (68.3)	139 (72.0)	157 (78.9)	139 (72.0)
Chi-square	0.49		0.32		0.09		0.02 ^a		0.18		0.00 ^c		0.00 ^c		0.27		0.08	
Chronic disease / health complications																		
Without	With	Without	With	Without	With	Without	With	Without	With	Without	With	Without	With	Without	With	Without	With	Without
Deficient HL	59 (33.0)	61 (32.1)	70 (39.1)	68 (35.8)	84 (46.9)	79 (41.6)	46 (25.7)	61 (32.1)	71 (39.7)	81 (42.6)	66 (36.9)	87 (45.8)	65 (36.3)	79 (41.6)	55 (30.7)	56 (29.5)	53 (29.6)	38 (20.0)
Optimal HL	119 (66.5)	129 (67.9)	108 (60.3)	122 (64.2)	95 (53.1)	111 (58.4)	133 (74.3)	129 (67.9)	107 (59.8)	109 (57.4)	111 (62)	102 (53.7)	111 (62)	108 (56.8)	123 (68.7)	133 (70.0)	124 (69.3)	152 (80.0)
Chi-square	0.46		0.28		0.18		0.11		0.33		0.06		0.18		0.44		0.02 ^a	

a $p < 0.05$; b $p < 0.01$; c $p < 0.001$.

proved the impact of the age factor and educational degree on HL. Health literacy is qualified negatively by age factor and positively by educational degree [22, 23]. A Slovak study among the general adult population reported a difference in HL according to age in only one domain, and in 3 domains according to gender [19].

A comparison of HL in the Slovak republic with EU countries for specific groups of future medical workers is missing. The research showed that students of medical studies, especially those in the lower classes (1–3) and Slovak students had more inadequate knowledge in health literacy than students of the higher classes (4–6). Medical students of lower classes assume there are gaps in their knowledge and that they do not have enough information about health issues. Beside this restriction, students seem to have problems in the comprehension of written medical reports, medical check-up instructions and how to use medicaments properly. These findings are in accordance with a survey which focused on students' health literacy, where the higher the class was, the better the degree of health literacy [24]. This result proves that education may play a crucial role in developing and understanding HL. The survey has proved that HL is associated with education [7, 27].

In evaluating the gender factor we have found that men more often showed an optimal degree of HL. Students without health complications and chronic disease more had deficient health literacy. The interesting fact is that men are better at active co-operation with HL providers and better oriented in HL system. A similar survey concerned with the degree of health literacy of medical students' shows that men had a better degree of HL in all fields except for comprehending and understanding health care providers [24]. Similarly, a survey concerning the level of health literacy among students of a technical study field, showed lower health literacy among male students compared to females [25], which is in contrast to our findings on medical students. A Slovak study among the general adult population reported that women had higher levels in three HL domains [19].

Surveys, whose aim was to observe health literacy between sexes, showed a better degree of health literacy in women. Women proved to be better at finding and understanding medical information and understanding the health care provider and its support [20, 26].

Besides Slovak students, the survey involved foreign ones. In comparison, foreign students studying in Slovakia are more active in taking care of their health, taking active part in co-operation with health care providers and are better oriented in the system of health care. The medical students stated they are better informed in how to take care of their health and showed skills in searching information concerning health. The above-mentioned survey by Zhang et al. [24] highlights the interesting findings that students who study technology have a better degree of health literacy than students of related medical studies. These students (of technical field of studies) take care of their health more actively and have excellent skills in identifying valid information about their health and are able to solve incorrect information on their own or with help. Besides

these facts, they have appropriate social support, which is needed for their health. These findings have proved that each faculty has a different curriculum concerning with health.

To compare this survey with Mulans et al.'s [8], medical students – when compared with non-medical ones – had a better degree of health literacy in all nine fields. Besides the mentioned findings, we also focused on students' health conditions. A surprising and more interesting fact is that 48% of students stated the presence of chronic illness (health complications, and more than 50% of women consider their health condition to be the worst one). Students not suffering from chronic disease stated more complications in social support, active co-operation with the health care providers and showed difficulties in being orientated in the system of health care and had problems comprehending the health care system. A survey which was conducted at Zagreb University focused on the importance of risky factors concerned with cardiovascular illnesses, and gave recommendations on how to improve knowledge of medical students (as it was unsatisfactory). Authors of the study in Zagreb University therefore recommended innovation within the university curriculum – which should contain more information about the risk factors of students' lifestyle. This survey, like the others, shows that there is a lack of medical information and there are more difficulties with acquiring and processing related recommendations [28]. In comparison, this survey, which was based on HLQ questionnaire, proves that Slovak students' show difficulties in understanding general information related to health. It is recommended that sufficient information about health care and the ability to find the most recent information should be included in the curriculum of each study programme (for medical and non-medical fields of study).

The contents of the curriculum in the field of health literacy is partly included in several syllabi of higher pregradual classes of medical and medically-related study programmes. Therefore, the matter of health care is becoming of central interest in curricula development for medical and non-medical programmes.

Weaknesses/strengths

The positive aspect of this survey is that it provided information about health literacy. It is the first study realized in Slovakia using HLQ questionnaire. Beside that, we have discovered that particular domains face insufficient information, and need proper provisions for improving the degree of health literacy. If we were able to create proper measures for improving the health literacy level from the beginning of the studies – for instance by adjusting the student curriculum, developing new modules for professional preparation that are not adjusted only for the improvement of HL of their patients but also for the improvement of HL of the medical student population – such students will be able to take care of their health as well as the health of their patients.

This survey is a part of an international survey which was realized at Auckland University, focusing on health

literacy degree at medical and nursing faculties in many states like – China, Denmark, Norway, Netherlands and Spain.

Associations with sex and age differed by the specific health literacy dimension, which is the main negative aspect of this study. There is no clear conclusion with regards to what level of health literacy has been achieved for medical and non-medical students. The main weakness of our study is the fact that our sample consists of unbalanced proportions of students of medical and non-medical study programmes, grades of study and type of students. Therefore any generalisations about the achieved level of health literacy among students, especially in medical and medical related fields of study, had to be made with caution. Disbalances were caused by the voluntary participation of respondents and were not affected by the researchers.

For this reason, further continuation in research among medical students and their HL is recommended.

Conclusions

Developing the health literacy of medical students and students of related fields of study (during the first years of studies) may help to improve health issues. On the basis of our findings, we will be able to innovate curriculums of medical and medical related fields of programmes, and create proper precautions which would be part of theoretical and practical education. Moreover, the health literacy concept in the area of communication, searching, understanding and processing information related to health, as well as being oriented in the system of health care also need revision.

Conflict of interests

The authors declare that in the completion of this article they have no conflict of interests.

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