

POST-PANDEMIC HEALTH LITERACY: COVID-19 KNOWLEDGE AMONG FUTURE TEACHERS IN THE CZECH REPUBLIC

Tereza Sofková, Michaela Hřivnová

Department of Anthropology and Health Education, Faculty of Education, Palacký University Olomouc, Olomouc, Czech Republic

SUMMARY

Objectives: The global situation concerning the incidence of infectious diseases emphasises the need for increased health literacy, particularly after the COVID-19 pandemic. A large part of this need relates to the area of education. The aim of this study was to analyse health literacy in relation to the cognitive dimension in the field of knowledge about the COVID-19 disease in the post-pandemic period among future teachers.

Methods: The research sample comprised 286 female students in the first year of Bachelor's teacher training courses at the Faculty of Education in the Czech Republic. The research study was conducted during the academic year 2022/2023. To explore the level of health literacy, the present research used the standardized HLS-EU-Q86 questionnaire designed by the World Health Organization. For the purposes of this study, the original 'structured interview' method was changed to an online questionnaire. An additional online questionnaire was attached to explore participants' knowledge related to the COVID-19 disease.

Results: The average score for general health literacy was 34.1, placing it within the 'sufficient' category. A total of 14.0% of the students showed an excellent level and 38.1% a sufficient level of general health literacy. Relatively the most favourable results were observed in the dimension of health promotion literacy. The threshold for successful completion of each knowledge test related to the COVID-19 was set at 80% of correct answers. Only 14.0% of the future teachers met the criteria for inclusion in the overall excellent level of the knowledge test.

Conclusions: The level of knowledge of future teachers associated with COVID-19 is inadequate. Therefore, it is desirable to strengthen education in the field of prevention of infectious diseases. The results indicate the need for some action, e.g., expanding the portfolio of compulsory courses in all branches of teacher training in order to increase the level of health literacy among future teachers.

Key words: health literacy, health promotion, disease prevention, COVID-19, teacher training

Address for correspondence: T. Sofková, Department of Anthropology and Health Education, Faculty of Education, Palacký University Olomouc, Žižkovo nám. 5, 771 40 Olomouc, Czech Republic. E-mail: tereza.sofkova@upol.cz

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INTRODUCTION

Health literacy (HL) is one of the fundamental factors that affect health and the onset and development of many diseases. HL involves a set of cognitive and social skills that determine the motivation and ability of individuals to gain access to, understand and use information in ways that promote and maintain good health. Increasing the level of HL among the Czech population is a necessary precondition for improving health and reducing the prevalence of diseases related to lifestyle or risky behaviour. The objective of international as well as national strategic documents of the World Health Organization (WHO) and the Ministry of Health of the CR, such as Health 2030, is to increase the level of HL among the population. Education is one of the core intervention areas, which is part of the first strategic goal of the programme Health 2030 – Protecting and Improving Public Health (1). The Health 2030 programme builds on Health 2020, which was the basis for Action Plan 12 Development of Health Literacy (2). The level of HL among teachers affects its development among their students. In the Czech Republic, the Framework Education Programme for Elementary Education (FEP EE) became the

fundamental binding state-level intended curriculum in 2004. Health education as well as the development of HL is included in the educational area Man and Health and educational field Health Education. Nutbeam (3) postulated that the key outcome of health education was a health-literate individual. Therefore, faculties of education offer undergraduate teacher training in Health Education (4, 5). However, achieving the aim of elementary education as mentioned above is the responsibility of all teachers. Thus, it is desirable to strengthen the educational competency in HL as part of undergraduate teacher training. This was strongly highlighted by the global pandemic caused by COVID-19. The pandemic emphasised the urgency of developing harmonised public health competencies for epidemiology and other areas (6). In recent years, and especially since 2022, a major revision of the FEP EE has been under consideration (7). The revision is being prepared in compliance with the 2030+ strategy (8) and OECD's international education strategy (9). The vision and idea of the so-called major revision of the FEP EE is that education will better prepare individuals for life and work in the 21st century. At the same time, education will be more focused on acquiring the competencies needed for an active civil, professional and

personal life. The document will directly include references to a holistic concept of health, the formation of HL and wellbeing. As suggested by Nutbeam (10), the development of HL logically includes the prevention of diseases including infectious diseases.

In the Czech Republic, 59.4% of respondents show insufficient HL, with 49.5% in health care, 54.1% in disease prevention, and 64.3% in health promotion (11). The Czech Republic ranked eighth out of the nine surveyed countries, making it the penultimate country in terms of HL. Kučera et al. (11) further state that HL is negatively correlated with age and positively with education. From a historical and gender perspective, a higher level of HL is attributed to women as opposed to men (12).

The purpose of this research is to analyse the level of HL in relation to knowledge related to the COVID-19 disease among students enrolling in the first year of teacher training courses at the Faculty of Education. The formulation of the objectives was based on the general expectation of society that teachers adequately improve various literacies of their students in the context of education. The authors were interested in the level of HL at the beginning of university study after completion of secondary education, and whether this entry-level was related to the cognitive dimension in the context of knowledge related to the COVID-19 disease.

MATERIALS AND METHODS

Research Group

The research group consisted of 286 randomly selected female students in the first year of Bachelor's teacher training courses at the Faculty of Education in the Czech Republic, with ages ranging from 18 to 30 years (24.4 ± 3.9 years). The authors conducted a research study aimed at future teachers whose HL is not affected by professional training. The research part of the project was carried out in the academic year of 2022/2023.

Health Literacy Questionnaire

The authors used the HLS-EU-Q86 questionnaire designed by the WHO and provided by the National Institute of Public Health in Prague, specifically the Centre for Public Health Promotion. For the purposes of this research, the original 'structured interview' method was changed to an online questionnaire. The core of the questionnaire was a battery comprising 47 questions that operationalized a sophisticated model of HL. The responses on five-item Likert scales were transformed into standardized indexes with values ranging from 1 to 50. The indexes of the HL dimensions (HC-HL – HL in the area of healthcare, DP-HL – HL in

the area of disease prevention, HP-HL – HL in the area of health promotion, and GHL – the general level of HL) have values from 0 to 50 points structured into four HL intervals: inadequate (0–25 points), problematic (26–33 points), sufficient (34–42 points), and excellent (43–50 points). General health literacy (GHL) was assessed using the GHL index, which was calculated based on responses to questions Q1/1–47. Only those respondents who indicated a maximum of four responses 'I don't know' out of the 47 cases were included in the calculation.

Questionnaire Survey in the Field of Knowledge Related to the COVID-19 Disease

The research tool for investigating knowledge related to the COVID-19 pandemic was an online questionnaire designed by the authors based on relevant scientific literature. In designing the research tool (questionnaire), all relevant procedures were observed (14). The research tool (achievement test) consisted of a total of 28 items (28 points = 100%). Each test item contained a statement (true or false) about prevention, diagnosis, risks, effects, and the pandemic caused by COVID-19 in general. The results were classified into three variation zones interpreted as success categories: 1 – excellent level (80–100%), 2 – very good level (60–79%), and 3 – insufficient level (0–59%).

Data Analysis

The data were collected through a questionnaire survey using Google technology and then converted into MS Excel. Statistical data analysis was carried out using the Statistica 13.0 program (StatSoft, Tulsa, USA). Key statistical quantities for the monitored parameters and their differences between the indexes of the HL dimensions were calculated. Normal data distribution was not achieved, as indicated by the Shapiro-Wilk test used to test the parameters. To determine the relationship between the level of HL and achievement in the knowledge test, the contingency tables method was used. Statistical significance was determined by the Pearson's chi-squared test. Statistical significance was determined at $p < 0.05$.

RESULTS

The indexes of the HL dimensions by areas among the university students are presented in Table 1. Table 1 shows the average values for each HL dimension on a 0–50-point scale,

GHL achieves a value of 34.1, the sufficient category. Table 1 also shows that the highest average of HL is in the area of health care (HC-HL).

Table 1. Comparison of general health literacy including its dimensions

	M	SD	MED	Q1	Q3
HC-HL	34.9	7.3	34.4	29.2	39.5
DP-HL	34.2	8.4	33.3	27.7	41.1
HP-HL	33.3	8.8	32.2	28.1	39.6
GHL	34.1	7.1	33.2	28.9	39.1

HC-HL – health literacy in the area of healthcare; DP-HL – health literacy in the area of disease prevention; HP-HL – health literacy in the area of health promotion; GHL – general level of health literacy

The level of GHL by categories among the students at the beginning of their first year is presented in Figure 1. Figure 1 shows that 14.0% of the female students achieve the highest level of HL, while 38.1% of the students fall into the sufficient category and 35.7% of the students are in the problematic category. A dichotomous distribution, combining positive and negative response items, is clearer. Overall, 47.9% of the students show inadequate or problematic GHL.

A comparison of the present results with a previous study aimed at HL among adult population in the CR (11) revealed a very positive shift in GHL (Fig. 1).

Interesting results were observed in the increased rate of favourable HL, along with a decrease in limited HL among students compared to the 2016 results for the adult population.

It should be noted that the 2016 study was conducted on a general population and therefore the findings of our study on university students may not be directly comparable. However, our study aimed to investigate HL among university students, who are generally younger and in different educational contexts.

The evaluation of knowledge related to the COVID-19 disease shows that 14 test items out of 28 (50%) were answered by the university students below the expected 80% success threshold. The lowest rate of correct answers was in the statement concerning the time required to wash hands in order to prevent infectious diseases (14.6%). A serious lack of knowledge was also confirmed in the items relating to diagnosis/testing, vaccination as well as possible complications accompanying the COVID-19 disease, where less than 30% of the respondents indicated the correct response. The highest number of correct answers was in the item

suggesting that COVID-19 is a viral disease (99.2%). In the items related to generally known facts related to COVID-19 presented by mainstream media, the respondents were relatively successful and scored over 90% of correct answers.

Table 2 shows the absolute number of respondents in the knowledge categories (3 variation zones as success categories) in relation to HL in the area of disease prevention (DP-HL). The analysis of the results of the knowledge test shows that only 14% of the university students met the criteria for inclusion in the excellent knowledge category. However, almost 60% of the university students showed a very good level of knowledge test, indicating room for learning relevant and scientifically based information relating to DP-HL. The category of insufficient level of knowledge test is considered absolutely unacceptable for the teaching profession, accounting for a total of 27.3%. Only 7 out of 54 students with an excellent level of HL in the area of disease prevention achieved the success threshold in the knowledge test. No statistically significant difference was observed in the COVID-19 knowledge categories between DP-HL dimensions ($p = 0.61$).

It is interesting to compare HL in the individual dimensions. The results suggest that the worst situation is in health care. Almost two thirds (59.5%) of the students report limited health-care literacy. The situation is better in the dimension of disease prevention, or the ability to obtain adequate information, evaluate it and use it to prevent specific diseases. Overall, 55.6% of the students show limited literacy in this dimension. A relatively decent level was observed in understanding and knowledge in the dimension of health promotion. Less than half of the respondents, specifically 48% of the students, fall into the decreased literacy

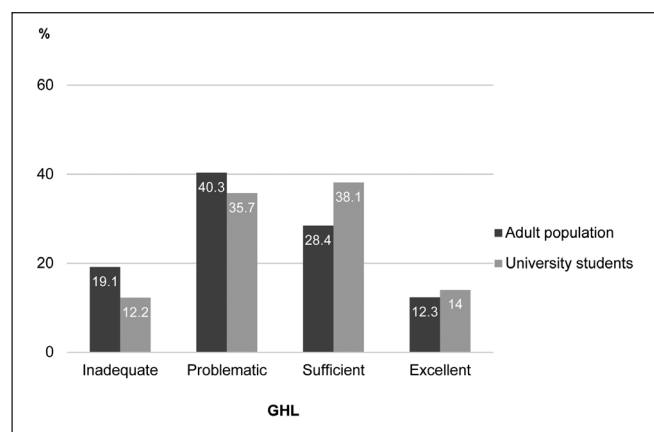


Fig. 1. Students' general health literacy.

Comparison of the present study with the 2016 results (11)

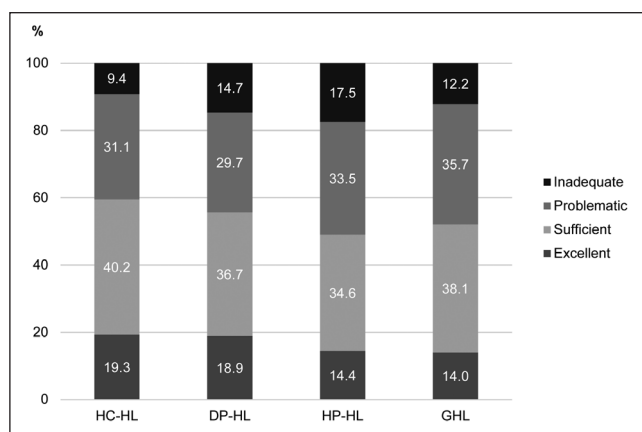


Fig. 2. Health literacy intervals in the health literacy dimensions.

HC-HL – health literacy in the area of healthcare; DP-HL – health literacy in the area of disease prevention; HP-HL – health literacy in the area of health promotion; GHL – general level of health literacy

Table 2. Numerical representation in health literacy intervals in relation to the knowledge test

	Insufficient	Very good	Excellent	Line total n (%)
Inadequate	15	23	4	42 (14.7)
Problematic	25	45	15	85 (29.7)
Sufficient	25	66	14	105 (36.7)
Excellent	13	34	7	54 (18.9)
Column total	78 (27.3)	168 (58.7)	40 (14.0)	286 (100.0)

Success categories: insufficient level (0–59%); very good level (60–79%); excellent level (80–100%)

zone (Fig. 2). Thus, it is easier for students to obtain information related to their own healthy lifestyles and health promotion than information related to the functioning of the healthcare system.

DISCUSSION

Sun et al., (15) reported that HL was also affected by prior knowledge and age, suggesting that the effect of prior knowledge was positive, while the effect of age was negative. HL is a direct influencing factor of health behaviour. Health behaviour and health status have a positive interaction effect. The most important factor of health status is age (16). Among the citizens of the CR in 2016 (11), sufficient or excellent HL was achieved by 40.7% of the respondents, while in the present research this level was achieved by 52.1% of the students (HL sufficient interval 38.1%, HL excellent interval 14%).

The results of the study suggest that despite the good availability of information in the current era which is sometimes referred to as the modern information society, even well-educated young people have low knowledge in the field of COVID-19 disease and are not overly interested in their HL.

Poor HL can have negative effects on the health of the entire population (16). During the COVID-19 pandemic, global studies were conducted to assess the knowledge and attitudes of different population groups concerning COVID-19. For example, Naveed and Shaukat (17) demonstrated the effect of HL level on the knowledge of COVID-19 among university students, reporting a higher level of knowledge among students living in urban areas. On the other hand, Vicerra (18) reported a higher number of correct responses to questions concerning COVID-19 among students from rural locations. Walle et al. (19) conducted a research study aimed at assessing knowledge about COVID-19 among health professionals. They observed good knowledge among more than three quarters of the respondents. Saeed et al. (20) performed a research study aimed at the general public and observed that the overall score in the area of COVID-19 considerably differed by gender, marital status, place of residence, educational attainment, and employment. Women had better knowledge than men. Participants with lower educational attainment showed a lower level of knowledge. The knowledge of students of healthcare study programmes concerning COVID-19 was addressed, among others, by Quisao et al. (21) or Ganczak et al. (22).

Lombatti et al. (23) reported on the Association of Schools of Public Health in the European Region (ASPHER) 20 key lessons learned, and recommendations drawn from three broad influences: international reports, ASPHER COVID-19 Task Force publications and country perspectives. The ASPHER Competency Framework for Applied Infectious Disease Epidemiology exemplifies harmonised approaches to investigating and controlling infectious diseases.

CONCLUSIONS

The results are unsatisfactory because almost half of the future teachers showed inadequate or problematic GHL. It is interesting to compare HL in the individual dimensions. Relatively the most favourable results were observed in the dimension of health pro-

motion literacy, i.e., in the use of information related to maintaining and strengthening one's own health and health potential. The results suggest that the worst situation is in HC-HL. The analysis of the results of the knowledge test shows that the criteria for inclusion in the excellent knowledge category were met by only 14% of the future teachers. This implies that the knowledge dimension of future teachers associated with COVID-19 is alarming and may become a limiting factor in the educational reality. Considering the fact that students of undergraduate teacher training courses will shape and develop the level of HL of the young generation in the near future, it is desirable that they possess the highest possible level of HL and an excellent level of knowledge. In designing undergraduate teacher training courses for all teachers, it is therefore necessary to create a space for systematic education in the field of HL and to include new and up-to-date topics (for example, the COVID-19 pandemic) in HL disciplines in order to increase the level of HL of future teachers. The recommendations based on the results could be summarized into a call for action that would stimulate the implementation of a broader portfolio of compulsory study disciplines of the so-called Teacher Qualification Module in order to increase the level of HL in students of Teaching, i.e., future teachers before they enter the teaching process.

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Conflicts of Interest

None declared

REFERENCES

1. World Health Organization. Health and well-being and the 2030 agenda for sustainable development in the WHO European Region: an analysis of policy development and implementation. Copenhagen: WHO Regional Office for Europe; 2021.
2. World Health Organization. Health 2020. A European policy framework and strategy for the 21st century. Copenhagen: WHO Regional Office for Europe; 2013.
3. Nutbeam D. Health literacy as a public health goal: a challenge for contemporary health education and communication strategies into the 21st century. *Health Promot Internat.* 2000;15(3):259-67.
4. Hřivnová M. [Health literacy in the professional training of teachers]. In: [Preventive programs in nursing care: Proceedings of the 12th Scientific International Conference]; 2017 Apr 6; Prague. Prague: University of Health Sciences; 2017. p. 12-8. Czech.
5. Marádová E. [Reflections on the past, present and future perspectives of teaching training in health promotion]. In: Slaná Reissmannová J, Gajzlerová L, editors. [70 in health: proceedings of the international conference]; 2016 Sep 8-9; Brno [Internet]. Brno: Masaryk University; 2016. p. 77-94 [cited 2024 Oct 15]. Available from: <https://munispace.muni.cz/index.php/munispace/catalog/book/865>. Czech.
6. Bashkin O, Otok R, Leighton L, Czabanowska K, Barach P, Davidovitch N, et al. Emerging lessons from the COVID-19 pandemic about the decisive competencies needed for the public health workforce: a qualitative study. *Front Public Health.* 2022 Sep 2;10:990353. doi: 10.3389/fpubh.2022.990353.
7. Ministry of Education Youth and Sports. [Major revisions: framework education programme for elementary education] [Internet]. Prague: NPI; 2022 [cited 2024 Oct 15]. Available from: <https://velke-revize-zv.rvp.cz/>. Czech.
8. Ministry of Education Youth and Sport. [Education policy strategy of the Czech Republic until 2030+] [Internet]. Prague: MEYS; 2020

- [cited 2024 Oct 15]. Available from: https://www.msmt.cz/uploads/Brozura_S2030_online_CZ.pdf. Czech.
9. Organisation for Economic Co-operation and Development. Future of education and skills 2030 [Internet]. Paris: OECD; 2020 [cited 2024 Oct 15]. Available from: <https://www.oecd.org/education/2030-project/>.
 10. Nutbeam D. The evolving concept of health literacy. *Soc Sci Med*. 2008 Dec;67(12):2072-8.
 11. Kučera Z, Pelikán J, Šteflová A. [Health literacy in Czech population results of a comparative representative research]. *Cas Lek Cesk*. 2016;155(5):233-41. Czech.
 12. Kickbusch I, Pelikan JM, Apfel F, Tsouros AD, editors. Health literacy. The solid facts. Copenhagen: WHO Regional Office for Europe; 2013.
 13. Riegerová J, Přidalová M, Ulbrichová M. [Application of physical anthropology in physical education and sports]. Olomouc: Hanex; 2006. Czech.
 14. Hendl J. [Qualitative research: basic methods and applications]. Prague: Portál; 2005. Czech.
 15. Sun X, Shi Y, Zeng Q, Wang Y, Du W, Wei N, et al. Determinants of health literacy and health behavior regarding infectious respiratory diseases: a pathway model. *BMC Public Health*. 2013;13:261. doi:10.1186/1471-2458-13-261.
 16. Altin, SV, Finke I, Kautz-Freimuth S, Stock S. The evolution of health literacy assessment tools: a systematic review. *BMC Public Health*. 2014;14:1207. doi:10.1186/1471-2458-14-1207.
 17. Naveed MA, Shaukat R. Health literacy predicts Covid-19 awareness and protective behaviours of university students. *Health Info Libr J*. 2022 Mar;39(1):46-58.
 18. Vicerra PMM. Disparity between knowledge and practice regarding COVID-19 in Thailand: a cross-sectional study of older adults. *PLoS One*. 2021 Oct 26;16(10):e0259154. doi: 10.1371/journal.pone.0259154.
 19. Walle Z, Berihun G, Keleb A, Teshome D, Berhanu L. COVID-19 prevention practices and determinant factors among healthcare professionals working in hospitals of South Gondar Zone, Northwestern Ethiopia. *J Multidiscip Healthc*. 2021 Aug 22;14:2287-98.
 20. Saeed BQ, Elbarazi I, Barakat M, Adrees AO, Fahady KS. COVID-19 health awareness among the United Arab Emirates population. *PLoS One*. 2021 Sep 13;16(9):e0255408. doi: 10.1371/journal.pone.0255408.
 21. Quisao EZS, Tayaba RRR, Soriano GP. Knowledge, attitude, and practice towards COVID-19 among student nurses in Manila, Philippines: a cross-sectional study. *Belitung Nurs J*. 2021 Jun 28;7(3):203-9.
 22. Ganczak M, Pasek O, Duda-Duma Ł, Komorzycka J, Nowak K, Korzeń M. A Peer-based educational intervention effects on SARS-CoV-2 knowledge and attitudes among Polish high-school students. *Int J Environ Res Public Health*. 2021 Nov 20;18(22):12183. doi: 10.3390/ijerph182212183.
 23. Lombatti S, Magid A, Davidovitch N, Middleton J, Sheek-Hussein M, Lopes H, et al. The COVID-19 pandemic as a public health teacher-the lessons we must learn. *Public Health Rev*. 2024 May 7;45:1607232. doi: 10.3389/phrs.2024.1607232.

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