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Original research article

Measuring the factors affecting health literacy in East Hungary – Health literacy in the adult population of Nyíregyháza city

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ECHP, European Community Household Panel
EU-SILC, Statistics on Income and Living Conditions
HLS-EU, The European Health Literacy Survey
MHP, Hungarian Household Panel
NVS, Newest Vital Sign
S-TOFHLA, Short-Test of Functional Health Literacy in Adults

ABSTRACT

As a critical determinant of health at a population level, knowing health literacy is essential for effective health promotion and for the positive influence on health status. However, very little research has focused on this topic in Hungary. We aimed to measure health literacy and find the factors affecting it among the adult population in Nyíregyháza city. The results contribute to improving health literacy, thus improving health behaviour, which is needed to develop individual and community strategies.

Our study was carried out in the framework of the “Quality of life of Nyíregyháza – Household Panel” research, by using two health literacy measurement tools, the Newest Vital Sign and the perception-based Chew screening questions. The selected respondents were required to be over 18 years of age and had to be permanent residents of the city. Interviewers questioned the selected 541 households in the months of April–May 2018.

Out of the 541 households, 391 households answered the questionnaires, which represents a 72.3% response rate. The average rate of health literacy level among the adult population in Nyíregyháza is in line with other Hungarian studies that previously measured the average rate of health literacy at population level.

The results show that the health literacy of the population of the city is most affected by their educational level. Our research reveals that the health literacy of the population is not significantly affected by their economic activity and income at local level. The need for the development of interventions within the framework of inter-professional cooperation that improve the level of health literacy, and focus on the low-educated population groups is urgent.

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Introduction

Nowadays, thanks to the practical use of scientific results, the quality of life of a country's population has a high priority for both the individual and the community and has risen to a higher level. The quality of life is determined by several factors. By influencing these factors through positive directions, the well-being of the community can be improved. In order to improve the quality of life and to start making the necessary changes, the influencing factors that can identify the points of intervention should be precisely identified as the development of the related actions and their implementation cannot be realised without them. Health literacy is a skill that helps the individual to receive and understand the information necessary for staying healthy. Thus, health literacy is the ability to access, interpret and understand the basic health-related information and services. In addition, it is the competence of using the information and services in order to develop health [1]. Health literacy determines our health status and thus our quality of life. In health care and health promotion, as well as the exact assessment of the health literacy of the target group of social care, the knowledge of health literacy level is very important in order to provide the efficient provision. The caring and provision are essentially determined by whether the clients are able to properly understand and use the information provided by the professionals. According to the 1998 definition of the World Health Organization, the concept of health literacy includes the individual motivation factors of finding information and the skills supporting these factors [2]. According to several studies, lower health literacy means a higher and longer risk for the quality of life, and for health status and various differences that result in health treatments [3]. It has a negative impact on the older population and on early mortality [4]. People with lower health literacy have lower health status [3, 5], and the number of people with an unhealthy lifestyle is higher among them. Health literacy shows a close relationship with education level, financial status and employment [5]. The importance of this subject and of developing local and national strategies were highlighted by several public health documents issued in 2016 [6–8].

There are very few studies focused on the measurement of health care and the development of a health questionnaire in Hungary. In recent years, there have been three researches attempting to develop a tool to measure health literacy. In 2013, Nagy et al. [9] developed an online-based health literacy measurement tool to measure basic health knowledge within the scope of health literacy in third, fifth, and seventh-grade students.

It was concluded that the tasks and tests in the survey were good, but in light of the results they proposed the inclusion of more difficult health literacy tasks and more tasks to measure functional health in the survey. Gács et al. [10] identified that parental health literacy is an important factor of paediatric health. Four dimensions of parental health literacy were formulated: knowledge, functional literacy, self-confidence and motivation. As a

result, this is the first culturally adapted definition and test of parental health literacy that is in Hungarian. In 2015, Papp-Zipernovsky et al. [11] translated and validated the Short-Test of Functional Health Literacy, and the perception-based Chew screening questions for health literacy in Hungary. It was concluded that the reliability of the reading part of the Short-Test of Functional Health Literacy was excellent, and it was also acceptable regarding the Chew screening questions, but it showed low internal consistency concerning the numeracy part of the Short-Test of Functional Health Literacy. The research results show that participants were categorized into three groups: 8% had inadequate, 6% marginal and 86% adequate health literacy levels based on the S-TOFHLA reading scores. The Szinapszis Market Research and Consulting Ltd. carried out research using the HLS-EU 47 questionnaire. Working with a national representative sample of Hungary ($n = 1008$), they found that 20% of the respondents have an inadequate health literacy level and 32% have marginal health literacy level [12]. In the same sample, the respondents showed good practical health literacy based on the NVS [13]. These were the first studies that tried to adapt the questionnaire and measure the health literacy at a population level in Hungary. As mentioned above, due to low research case numbers it can be stated that in Hungary we have little knowledge of the health literacy at a population level.

In the present study we aim to measure the healthy literacy among the adult population in Nyíregyháza city by using measurement tools that allow national and international comparison. In addition, we aim to explore a wide range of factors affecting health literacy and to identify additional background factors (demographic, socio-economic, etc.) so that the urban health plan – which is under development, can work as efficiently as possible.

Materials and methods

Overview

Our research was carried out in the framework of the “Quality of life of Nyíregyháza – Household Panel” research [14, 15], which is based on previous international and national studies that followed the so-called household panel methodology. It primarily collects information regarding urban households, whilst collating information regarding the specified characteristics of their members. It tries to uncover the changes in the same population sample with the same questionnaire, which, in essence, means the interviewers visit the same households at specific intervals. Taking the international and the national household panel history into account, the household panel study of Nyíregyháza launched in 2008. The city-level research used the questionnaires of the ECHP, the EU-SILC and the MHP conducted by TÁRKI in order to make the local information comparable both on national and international level [16]. The difference between the “Quality of life of Nyíregyháza – Household Panel” research and the research conducted by TÁRKI is that this research surveys households within the

frameworks of a municipality. The survey focuses on the mapping of the self-evaluated health status and it tends to reveal the satisfaction with the support systems and the social department. So far, five inquiries have been made, from which the fifth wave was implemented in two parts. The inclusion of two parts in the questionnaire was justified by the fact that over the years the examined areas were expanded, so the time of the enquiry would have taken several hours, which could have greatly offset the willingness to respond. Therefore, the questionnaire package focusing on the public health status was included at a separate time on the same sample with the same methodology. The fifth wave first inquiry was in autumn 2017 and the second in spring 2018.

Measurement tools

In 2015, a completely new element of the health literacy dimension had evolved. Two validated health literacy measurement tools were used. The perception-based Chew screening questions is a questionnaire that has been developed and applied for pre-screening purposes. The questionnaire consists of 3 questions, each with a five point Likert response scale. Categories on the Likert response scale are: (0) Never; (1) Occasionally; (2) Sometimes; (3) Often; (4) Always. The lowest average score that can be obtained is 0 and the highest is 12. Based on the results, the individual's health level can be classified into three categories: inadequate, marginal or adequate [11, 17]. The Newest Vital Sign test consist of 6 questions that measure how an individual can read, understand, and use the information on an ice-cream product label. It measures three skills: reading ability, basic numeracy skills and problem solving ability. A total of 6 points can be obtained. The scoring categories are: (0–1) high likelihood of limited literacy, (2–3) possibility of limited literacy, and (4–6) adequate literacy [13, 18].

Sample selection

The official address list for sampling was provided by the Central Office of the Administrative and Electronic Public Service. The randomly selected respondents had to be over 18 years of age and were required to be permanent residents of the city. After the fifth-wave first inquiry, 541 completed and evaluable questionnaires were returned. During the second inquiry the interviewers visited the same households. From the 541 households, 391 households completed and returned questionnaires, of which 389 were evaluable (which represents a 72.3% response rate). The questionnaire surveys were conducted by interviewers in April–May 2018.

Statistical methods, evaluation criteria

The processing and analysis of the data take place with the application of SPSS for Windows 22.0 statistical software package. SPSS was used for all analyses, with the significance level set at 0.5. The frequency and distribution of the values of the variables considered to be relevant by the researchers were analyzed, and then the deeper

connections were investigated by one and two-variable statistical methods. The analysis of the data is still in the early stages, so in the present study we present only preliminary results.

Results

In terms of the demographic characteristics of the participants in the study, nearly two-thirds of the respondents are women, and the age and education show a pattern that correspond to before. Based on the ages of the participants, three age groups (young adults, middle age, elderly) were formed [19]. In terms of education, our questionnaire contained nine categories – from lack of an education up to doctoral degree. These were merged into three categories: primary, secondary and higher education (Table 1).

Table 1 – Demographic characteristics of the participants

	N	%
Age		
19–45	161	41.4
46–65	132	33.9
65+	86	22.1
Education		
primary	36	9.3
secondary	226	58.1
higher	112	28.8
Gender		
woman	246	63.2
man	143	36.8

Examining the willingness of the responses of the NVS test, it can be said that of the 389 respondents, 51.2% ($N = 199$) answered all the questions, 35.7% ($N = 139$) did not answer any of them, while 13.1% ($N = 51$) only partly answered. In the further analysis of the data, two important aspects were taken into account: from those respondents who answered all the questions, 84.4% gave a correct answer to at least 5 questions, so the proportion of correct answers were high. However, it is also important to mention that 48.8% of the respondents did not answer any of them, or only answered partly. Therefore the answers to the six questions were merged in different ways, and then analyzed to provide a comprehensive picture of the real health literacy of the population. In the first summary, only correct answers were scored (+1 points), and non-respondents were not aggregated (M1). In the second summary, good answers received +1 point, wrong answers 0 point, and missing answers –1 point (M2). Finally, the third summary awarded +1 point for good answers, –1 point for wrong answers, 0 points for a missing answer (M3). There was no significant difference between gender and age in the various summation variables. Even in education the first method did not show any difference.

But we found significant difference by using the 2nd and 3rd method, which had already taken into account the

refusal. People with higher education had higher average scores (Table 2).

Table 2 – The relationship between the 3 types of methods (used to analyse the NVS test) and the variables

	M1	M2	M3	Method
Age (3 groups) NS – NS – NS	$F(2, 193) = 0.339$; $p = 0.713$; $\chi^2(2, N = 196) = 1.382$; $p = 0.501$	$F(2, 376) = 1.420$; $p = 0.243$; $\chi^2(2, N = 379) = 1.795$; $p = 0.408$	$F(2, 376) = 0.375$; $p = 0.687$; $\chi^2(2, N = 379) = 0.891$; $p = 0.640$	ANOVA; Kruskal–Wallis test
Education (3 categories) NS – S – S	$F(2, 193) = 0.001$; $p = 0.999$; $\chi^2(2, N = 196) = 0.191$; $p = 0.909$	$F(2, 371) = 12.748$; $p = 0.000$; $\chi^2(2, N = 374) = 23.790$; $p = 0.000$	$F(2, 371) = 7.143$; $p = 0.001$; $\chi^2(2, N = 374) = 16.664$; $p = 0.000$	ANOVA; Kruskal–Wallis test
Gender NS – NS – NS	$t(197) = 0.707$; $p = 0.480$; $U = 41990.00$; $Z = -0.664$; $p = 0.507$	$t(387) = -1.194$; $p = 0.233$; $U = 16458.50$; $Z = -1.101$; $p = 0.271$	$t(387) = -0.526$; $p = 0.599$; $U = 17178.50$; $Z = -0.402$; $p = 0.688$	independent sample t -test; Mann–Whitney U -test

We also examined the demographic characteristics of the non-respondents. Among them ($N = 139$) women reported a significantly higher percentage of total respondents than men (proportion test, $\chi^2(1, N = 139) = 6.964$, $p = 0.008$). There is no significant difference in the age groups; the total non-response rate is the same in all age groups. At the same time, those with secondary education (proportion test, $\chi^2(1, N = 139) = 18.647$, $p = 0.000$, denied to answer to a significantly higher degree. During the data processing each answer was evaluated separately, categorizing the results as a good answer, wrong answer, or missing answer. The first question (*If you eat the entire container, how many calories will you have eaten?*) was the question most

answered. The least answered question was the third one (*Your doctor advises you to reduce the amount of saturated fat in your diet. You usually have 42 g of saturated fat each day, which includes one serving of ice-cream. If you stop eating ice-cream, how many grams of saturated fat will you be consuming each day?*) We received answers to the other questions in more or less the same proportion (55.8% to 59.9%). The most correctly answered question (94.2%) was the 5th one (*Pretend that you are allergic to the following substances: penicillin, peanuts, latex gloves, and bee stings. Is it safe for you to eat this ice-cream?*), while the least correctly answered was the third question (Table 3).

Table 3 – Number of responses to the NVS test

$N = 389$	1st question	2nd question	3rd question	4th question	5th question	6th question
No answer	141 (36.6%, 95% CI: 31.5–41.3)	158 (40.6%, 95% CI: 34.7–45.7)	172 (44.2%, 95% CI: 39.2–49.3)	163 (41.9%, 95% CI: 37.0–47.0)	166 (42.7%, 95% CI: 37.2–47.8)	165 (42.4%, 95% CI: 37.5–47.5)
Good answer	213 (85.9%, 95% CI: 80.8–89.9)	208 (90.0%, 95% CI: 85.3–95.5)	158 (72.8%, 95% CI: 66.3–78.5)	190 (84.1%, 95% CI: 78.5–88.5)	212 (95.1%, 95% CI: 99.1–97.4)	176 (78.6%, 95% CI: 72.5–83.6)
Wrong answer	35 (14.1%, 95% CI: 10.2–19.2)	25 (10.8%, 95% CI: 7.3–15.7)	59 (27.2%, 95% CI: 21.5–33.7)	36 (15.9%, 95% CI: 11.5–21.5)	11 (4.9%, 95% CI: 2.6–8.9)	48 (21.4%, 95% CI: 16.4–27.5)
Total number of answers	248 (63.8%, 95% CI: 58.7–68.5)	231 (59.4%, 95% CI: 54.3–64.3)	217 (55.8%, 95% CI: 50.7–60.8)	226 (58.1%, 95% CI: 53.0–63.0)	223 (57.3%, 95% CI: 52.2–62.3)	224 (57.6%, 95% CI: 52.5–62.5)

In examining the willingness of the responses to the Chew screening questions, we found that a higher percentage of the respondents (94%) answered this questionnaire than the NVS test.

Based on the analyses, the sample mean up to a maximum of 12 points was 2.17. The average score for each question was evaluated separately as well. There are no significant differences between the average results of each question.

The income and the economic activity were also examined, but it did not affect the health literacy among the respondents.

Discussion

In the sample, women are slightly over-represented, which may be due to the fact that we always asked the interviewers to ask the most prominent person in the household—and these are usually women.

Participants in the study did not respond equally to both health literacy measurement tools. 36.7% ($N = 139$) did not answer the NVS test questions, while 5.9% ($N = 23$) did not answer the Chew screening questions. The results are not surprising, since the Chew screening questions are

simpler, and can be answered in a much shorter time. In contrast, answering the NVS test is more difficult, although there are differences between the difficulty levels of each question. The least correctly answered question was the 3rd one, which also indicates the difficulty of the question. The easiest question was the 5th; the most correctly answered, which did not require numeracy skills. The reason for the high rate of refusal may also be due to those who did not respond not knowing the correct answer to each question – and so they tried to conceal their ignorance in this way. If we ignore this fact, we can get distorted results. Respondents with secondary education and women were more inclined to refuse to answer. The reasons behind these results are still to be explored.

Our Chew screening questions score was 2.2, while Papp-Zipernovsky et al. [11] received a score of 4.3. Based on these results, residents of Nyíregyháza have a higher health literacy level. Our NVS test score is similar to the score that Koltai and Kun [13] presented in their study, so the population has a very good health literacy level. However, the above-mentioned high level of those who did not answer could have distorted our results. At the same time, after a deeper analysis of this study, our results further confirm the finding that lower education level shows lower health literacy level. In addition, the literature also mentions that the rate of inadequate or marginal health literacy among the elderly population is higher [20].

Therefore, the development of the measurement tool and the measurement of health literacy among the Hungarian population at a national level are also urgent.

One of the most effective markers of any city's successful sustainable development is health, in which communities and neighbourhoods play a big role [6]. Health promotion of vulnerable groups (low-social status – education, elderly, etc.) through health literacy requires interprofessional cooperation [14, 21, 22]. Interprofessional work [23, 24] can particularly be used in environments where there are various and complex problems, and where prevention and treatment require a wide range of knowledge and methods. A targeted, local community based intervention can modify the health literacy of the population in a positive way, and thus influence their health behaviour. Effective intervention can be done in teamwork. Professionals who are professionally and methodologically well-trained can precisely identify the goals, target groups and intervention points. Courses and trainings are necessary for professionals, which aim to help to deeply understand the health needs of the different social groups [25]. Improving health literacy and health behaviour of the population improves the health of the individual, and it also plays a role so that the individual is also involved in health-related community activities. Therefore, strategies to reduce inequalities in the health status and health care system are indispensable. Providing information related to health, health and social care system in an understandable way create the opportunity to preserve and improve the health of disadvantaged and marginalized groups.

The novelty of our research is that health literacy has not been measured before in respect to the Hungarian cities. At the same time, the research has limitations, which should be mentioned. One is the low responsiveness of the

residents of the city, and the other is the refusal to answer the health literacy questionnaires (especially the NVS test).

Conclusions

In conclusions, the communication specified for the education and health literacy level in Nyíregyháza city is very important in health promotion, preventive and social services, patient care (both primary and outpatient care), and the implementation of intervention programmes. It is essential to raise the level of health literacy in order to influence the health status at a population level in a positive way and to reduce risky health behaviour. This requires public health interventions and the development of a health-oriented approach to key social players – professionals working in the health, social and educational spheres. With a health plan developed by professionals, positive changes can be achieved in the population health status in a planned way. Finally, both individual and community health planning should take into account the health literacy level of individuals and communities in order to be able to work efficiently with developed interventions.

Conflict of interests

The authors have no conflict of interests to disclose.

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