



ITALIAN JOURNAL OF SOCIOLOGY OF EDUCATION

Editor-in-Chief: Silvio Scanagatta | ISSN 2035-4983

The Health Literacy of Ethnic Hungarian Mothers in Eastern Europe

Ágnes Sántha*, Melinda Nagy**, Renáta J. Erdei***

Author information

- * Department of Applied Social Sciences, Sapientia Hungarian University of Transylvania, Romania.
Email: santhaagnes@ms.sapientia.ro
- * Department of Biology, J. Selye University in Komárno, Slovakia. Email: nagym@ujss.sk
- * Department of Health Methodology and Public Health, University of Debrecen, Hungary.
Email: erdei.renata@foh.unideb.hu

Article first published online

October 2020

HOW TO CITE

Sántha, Á., Nagy, M., Erdei, R.J. (2020). The Health Literacy of Ethnic Hungarian Mothers in Eastern Europe, *Italian Journal of Sociology of Education*, 12(3), 91-111.
DOI: [10.14658/pupj-ijse-2020-3-5](https://doi.org/10.14658/pupj-ijse-2020-3-5)

The Health Literacy of Ethnic Hungarian Mothers in Eastern Europe

Ágnes Sántha, Melinda Nagy, Renáta J. Erdei

Abstract: Parental health literacy is decisive for child health and quality of life. Children of parents with limited health literacy are at increased risk of illness and longer recovery periods. In Eastern Europe, child health indicators are worse than in the Western European countries, which calls for exploratory analysis. The aim of the study is to assess the health literacy of ethnic Hungarian mothers in Eastern Europe (Hungary, Romania, Slovakia), as well as to identify its socioeconomic and demographic antecedents. Sample size is 675 mothers. Our standardized online questionnaire included the HLS-EU-16 scale. Predictors of sufficient health literacy in mothers are age, partnership status, place of residence, educational attainment and socioeconomic status. Mothers who raise a child with chronic illness are significantly more likely to have limited health literacy than their fellows. Results indicate the necessity of improving mothers' health literacy in the region, particularly among the at-risk groups of young mothers, single mothers and caregivers of children with chronic illness.

Keywords: health literacy, HLS-EU-16, single mothers, children with chronic illness

Introduction

In Eastern Europe today, health indicators reveal a worse situation than that seen in the West. However, research indicates that this has not always been true. Prior to the 1960's, life expectancy was very similar in the two regions, but then, the generally convergent trajectories became divergent, primarily due to the superior health care performance of the West (Meslé, Vallin & Andreyev, 2002). Most recently there are, however, some emerging new signs of a convergence, without clear evidence that this would be a sustainable trend (Meslé & Vallin, 2017).

In Eastern Europe, particularly in Romania and Slovakia, the under-five mortality rate is double that of Western European countries (UN/IGME, 2019). Hospitalization rates of children under 5 are also more numerous (WHO/Europe, 2018), and the prevalence of developmental disabilities at young ages also exceeds the proportions reported for the West. Exclusive breastfeeding rates, early predictors of child health are low in infants up to 6 months, further, tooth decay and poor oral health in young children are more frequent. The immunization rates for vaccine-preventable diseases are also relatively low in the region (WHO/Europe, 2019).

Eastern European countries are not in the front line in terms of the prevalence of type 1 and type 2 diabetes. However, Hungary as an exception, beside the Balkan countries, has more adult diabetes cases than other countries in the region (Khan et al., 2019). Further, it should be noted that the increase in the incidence of childhood type 1 diabetes is highest in urban Poland and Romania (Patterson et al., 2019).

These worrisome data calls for exploratory analysis. This is the rationale behind our research, namely, to obtain information on the health literacy of a specific population segment: mothers of children aged 10 years or below, whose skills and competences as caregivers directly impact upon the health of their children. The health literacy of ethnic Hungarian mothers in Hungary, Romania and Slovakia is assessed specifically with regard to its antecedents, mostly to its socioeconomic and demographic predictors and to child health status. The central research question is which characteristics predict sufficient health literacy, and implicitly, which ones imply the risk for limited health literacy in mothers.

This paper has its theoretical roots in the concept of the European Health Literacy Project, where health literacy encompasses access, understanding, appraisal and application of health-related information in three domains: health promotion, disease prevention and health care (Sørensen et al., 2012).

Previous research conducted within this theoretical framework revealed a social gradient in the health literacy of Europeans. Low status groups and older people were overrepresented in the category with limited health lit-

eracy (Sørensen et al., 2015). Further, regional differences were identified, and most importantly, Eastern European countries had lower-than-average results. Bulgaria (Sørensen et al., 2015), the Czech Republic (Kučera, Pelikan & Šteflová, 2016) and Poland (Duplaga, 2020) scored systematically lower on the HLS-EU scales than did Western European countries.

Ethnic Hungarians in the Carpathian Basin are a culturally homogeneous population who share the idea of national unity and identify themselves with the Hungarian majority inside the borders of Hungary rather than their fellow citizens from the ethnic majority in their countries like Romanians or Slovaks (Veres, 2012). This identification and the perception of the pan-Hungarian ethnocultural nation justifies the choice made by the authors to study this specific population.

Parental health literacy and child health outcomes. A literature review

This section presents international research results on the relationship between parental health literacy and child health outcomes, a crucial issue for health research which underscores the importance of studying the health competences of caregivers.

Parental health literacy is associated with important child health outcomes, and health literacy mediates between parent and child health (DeWalt & Hink, 2009). Thus, parental/caregiver health literacy concerning the factors influencing child health outcomes is of first rank importance in preventing disease and increasing health-related quality of life in children. Inadequate health literacy of parents implies increased morbidity risk of under-age children and frequent illness relapses (Howe & Winterhalter, 2013).

Disadvantages resulting from limited parental health literacy have been revealed in several parts of the world with respect to a wide range of child health outcomes. Children of low health literate parents generally have worse health outcomes than children of parents displaying higher health literacy levels. Caregivers with low health literacy were likely to have a child without health insurance. They reported difficulties understanding over-the-counter medication labels, however, they were not disadvantaged with respect to nutrition label use (Yin et al., 2009). Children of parents with low health literacy had worse health outcomes in Kansas, US (Scotten, 2015). Controlled for social disparities, infants of mothers with adequate maternal health literacy had appropriate growth status, thus parenting self-efficacy was higher in health literate mothers starting from the first months of motherhood (Lee, 2016).

The efficacy in the management of child-onset chronic diseases is largely dependent upon parental health literacy (Borges et al., 2017). There is con-

clusive evidence for the association between parental health literacy and some childhood chronic diseases. Low health literacy of parents is associated with high relapse rates among children with nephrotic syndrome and few of them achieve complete remission (Borges et al., 2017). Limited parental health literacy makes it hard to care for the child suffering from asthma, as these parents worry more and perceive greater overall burden from the child's respiratory disease, even though their reported health care use does not vary (Shone et al., 2009).

Parental health literacy impacts parents' understanding of the child's diagnosis and treatment, so that caregivers with low health literacy rarely utilize the pediatric emergency care departments in hospitals (Morrison et al., 2013). Disparities in child health care are, however, not always associated with parental health literacy (Yin, Forbis & Dreyer, 2007). In some special settings, no disadvantage is revealed in the health care for children coming from low health literate parents. In an inner-city ethnic minority population in the United States, parental health literacy is not associated with inequalities in the use of child health services (Sanders, Thompson & Wilkinson, 2007). A study in Virginia State reveals that obese children engage in a family-based childhood obesity treatment program at similar rates to children of parents with high literacy and they also benefit from the program in the same proportion (Zoellner et al., 2017).

Child obesity, especially at young ages, is associated with the health literacy of parents. However, starting with adolescence, children's own health literacy is becoming more important in predicting obesity (Chari et al., 2014). An Iranian study identified some associations between the total food and nutrition literacy of children and sociodemographic variables including caregivers' education (Doustmohammadian et al., 2018). In India, children of mothers with higher health literacy were found to be much more likely to have a proper nutritional status, that is, much less likely to be either stunted or underweight, than children of less health literate mothers (Johri et al., 2016). Low parental health literacy is a risk factor for child sedentary lifestyle and risky family behaviour associated with child injury (Cheng et al., 2016).

Parental health literacy significantly influences glycemic control of children with type 1 diabetes in a United States sample, so that poorly controlled diabetes in children occurs with increased probability because parents with limited health literacy fail to comprehend the diabetes education they were provided (Hassan & Heptulla, 2010). They encounter hardships in adhering to more complex diabetes regimes being increasingly used and recommended in the present (Janisse, Naar-King & Ellis, 2010). Further, parental health literacy impacts upon the adequacy of medication administration for chil-

dren. Limited health literacy is associated with making a dosing error (Yin et al., 2010).

There is a significant positive association between parental health literacy and children's oral health status according to a number of studies. In Malaysia, preschool children of highly health literate parents have better oral health outcomes (Ismail et al., 2018). In Brazil, too, at an older age, schoolchildren's oral health and preventive care is largely determined by socioeconomic characteristics of the family (Paula, Ambrosano & Mialhe, 2015).

The literature is inconclusive with respect to the effect of the social gradient in vaccination, more specifically, in vaccine compliance. According to a meta-analysis of existing studies in the field, the relationship between health literacy and vaccination is unclear (Lorini et al., 2018). Usually and predominantly, low social status is a predictor for vaccine hesitancy and incompliance (MacDonald et al., 2015). In traditional societies like Gambia, mothers of poorly vaccinated children have larger families, themselves and their husbands are less educated, have a poorer knowledge of diseases and are rather superstitious of disease causation (Hanlon et al., 1988). In India, too, the rate of vaccination is significantly better in children of parents with more education and higher socioeconomic status (Ahmad et al., 2012).

However, recent studies account for a new trend. An Israeli study shows that parents with high levels of health literacy are more at risk of not vaccinating their children (Aharon et al., 2017). A new qualitative Australian study reveals that in specific communities, parents experience non-vaccination of their children as a form of cultural capital, and it is a part of their identity to question the need for vaccination and to refuse vaccines as a sign of their distinction. This way, it is precisely the highly educated parents who disseminate countering views to the one that vaccinations are socially beneficial (Attwell, Meyer & Bond, 2018).

In Eastern Europe, to our best knowledge, it is the limited knowledge of vaccination and the vaccination noncompliance of low status groups that has led to decreasing vaccination rates of babies and children. As a result, previously overcome communicable childhood diseases emerged newly, as was the case with measles in Romania recently (INSP, 2019).

The antecedents of mothers' health literacy: variable selection

This short section provides the rationale of the variable selection for the analysis. Those socioeconomic and demographic antecedents are presented which presumably determine the level of health literacy in ethnic Hungarian mothers, based on previous European research carried out mostly with the same instrument as our survey, the HLS-EU-16.

Health literacy was impacted by socioeconomic features such as education and income (Jordan & Hoebel 2015; Tiller et al., 2015; Garcia-Codina et al., 2019; Almaleh et al., 2017) and labour market status (Duplaga, 2020). Parents' health literacy was also associated with educational level (Harrington et al., 2015).

Research results were inconclusive as to the association between age and health literacy. Most studies found a negative correlation between the two (Jordan & Hoebel, 2015; Garcia-Codina et al., 2019), however, in a few cases, health literacy of adults improved with age (Tiller et al., 2015; Van der Heide et al., 2013; Duplaga, 2020). As far as the mothers' health literacy was concerned, results were contradictory, too. Some studies found no age effect (Naghshineh, Golshiri & Sichani, 2017), but Carolan found that in the United States, older mothers were better informed on child health issues (Carolan, 2007).

In some cases, family structure was found to be an antecedent of health literacy, in the sense that single parents displayed lower health literacy levels (Janisse, Naar-King & Ellis, 2010; Howe & Winterhalter, 2013; Kumar, Kroon & Lalloo, 2014). Marital status was a significant predictor for health literacy in the general population in Poland, too (Duplaga, 2020). Further, the number of children showed a negative correlation with maternal health literacy (Lee, 2016).

Studies reported on further types of social inequalities which our study does not cover, due to its design: ethnic minority status was associated with worse health literacy (Sanders, Thompson & Wilkinson, 2007), whereas gender was either found to be non-significant, or a health literacy gap emerged, albeit at the expense of men, as in Egypt (Almaleh et al., 2017) or at the expense of women as in an elderly East German population (Tiller et al., 2015).

Methods and sample characteristics

The survey was carried out in Hungary, Romania and Slovakia at the end of 2019. The questionnaire inquired about the basic demographic and socioeconomic features of mothers, it entailed items compiled by us on their factual knowledge in several topics of child health, questions on the information sources with respect to child health issues and on the health state of children. Further, the standardized HLS-EU-16 scale measured health literacy in the sense of the self-reported difficulties in accessing, understanding, appraising and applying information in tasks concerning decision-making in healthcare, disease prevention and health promotion, as understood by the European Health Literacy Project (Sørensen et al., 2012).

The questionnaire was completed online by members of mother groupings on social media sites, with permission of group moderators. Respon-

dents in all three countries - mothers of at least one child aged 10 years or less - were encouraged to complete the survey. Online, opt-in survey sample designs inevitably entail a selection bias (Dutwin & Buskirk, 2017). In order to minimize it and to render our results more generalizable, iterative proportional fitting was used, that is, the sample was weighted on age, education and geographic region.

We now have fully completed questionnaires from 675 mothers, with an age range from 20 to 47 years, a mean of 34,7 years (SD: 5,81). Average family structures are as follows: families consist of 3,8 persons (SD: 0,93), the mean number of children is 1,70, similar to national trends (SD: 0,67). 95,6% of mothers are married or partnered, and only 4,4% are singles. As far as their place of residence is concerned, 40,2% live in rural areas, 15,3% in small towns with less than 20000 inhabitants, 22,1% in medium size towns from 20000 to 100000 inhabitants, and 22,4% in towns or cities with more than 100000 inhabitants.

To measure socioeconomic status, the subjective social status was used as a proxy, measured on a scale of 1 to 10, where 1 denotes the bottom and 10 the top of the social hierarchy. Respondents rated their social status with a mean of 6,13 (SD: 1,28). Most mothers possess a university degree (65,8%), the rest finished high school or vocational school (29,6% and 4,6%, respectively). 59,6% of respondents are currently employed, 33,1% are on maternity leave, 1,5% are students, 0,7% are unemployed and 5,1% are housewives. As seen in this distribution, our sample displays a higher level of education than the general population, a bias due to the online data collection.

Overall, about every eighth respondent (14% in our sample), cares for a child with at least one chronic illness that requires regular medical visits. This fact renders addressing the issue of parental health literacy even more important.

The HLS-EU-16 measure was validated in several European countries and provided proof of good psychometric properties. So was it in Spain (Nolasco et al., 2018), in the Catalan population (Garcia-Codina et al., 2019), in Italy (Lorini et al., 2017), in Iceland (Gustafsdottir et al., 2020), in France (Rouquette et al., 2018), in Belgium (Vandenbosch et al., 2016), in Hungary (Gács, Kun & Koltai, 2019), in Poland (Duplaga, 2020), on a sample of low health literate Dutch population (Storms et al., 2017), in an Arabic population in Sweden (Wangdahl et al., 2019) and in Somali women in Norway (Gele et al., 2016).

In calculating the HLS-EU-16 scores, we proceeded following the recommendations of the HLS-EU research group and according to the methodology of some previous studies (Pelikan, Röthlin & Ganahl, 2014; Levin-Zamir et al., 2016; Almaleh et al., 2017; Lorini et al., 2017; Wangdahl et al., 2019; Duplaga, 2020). Original 5-point Likert-type answers were dichotomized

into two scores, “easy” (“fairly” or “very” easy = 1) and “difficult” (“fairly” and “very” difficult = 0), whereas “don’t know/refusal” answers were treated as missing. The scale score was calculated as the non-weighted sum of the sub scores on each item, with a final range between 0 and 16, higher scores indicating better health literacy. Missing values were estimated with a maximum likelihood algorithm for those persons who had at least 14 valid answers. Respondents with more than two missing answers were excluded from the analysis.

In our sample, the internal consistency of the items was adequate, the scale was reliable (Cronbach’s alpha, $\alpha = 0,763$). From the final scale scores, two levels of health literacy were defined: limited (0-12 points, encompassing insufficient and problematic categories) and sufficient (13-16 points). Although this methodological decision might seem arbitrary, it was used in previous studies (Levin-Zamir et al., 2016; Duplaga, 2020), and it is justified by our intention to identify at-risk-groups on the one hand, and to measure the probability of belonging to the group with limited health literacy, on the other.

Descriptive statistics are performed in selected topics of maternal health literacy, where factual knowledge of mothers on child health issues is assessed. The main knowledge gaps of mothers are revealed. Then, the aggregated answers resulting in the HLS-EU-16 health literacy scale are presented.

Thereafter, following categorisation into limited and sufficient health literacy groups, a binary logistic regression model is fitted for the two outcomes. With this, our aim is to predict the probability of socioeconomic and demographic categories to fall into the category of sufficient health literacy, controlled for other effects. Alleged antecedents of health literacy are selected based on the review of literature and on the results of previous empirical studies, as presented in the section *The antecedents of mothers’ health literacy: variable selection*.

Our objective was to obtain a general picture of Hungarian mothers’ health literacy and competences, as well as on their factual knowledge of child health issues. Our primary interest was to assess the predictors of sufficient health literacy. We were also curious to address the health literacy of caregivers of children with chronic illness. It is the learning from several international studies that low parental health literacy is associated with bad child health outcomes, although cross-sectional research designs do not allow for inference on the exact nature of the causal relationship. However, out of technical considerations, in our explanatory analysis we do include child illness among the antecedents, as our research focused on and inquired about the predictors and not about the consequences of health literacy. At the same time, it should be noted that an eventual causality between mothers’ health literacy and child health outcome could be justly demonstrated with longitudinal studies only.

The predictors introduced in the regression model are: age, partnership status, the number of children, caring or not for at least one child with chronic illness, the place of residence, educational attainment, socioeconomic status and labour market status.

Results

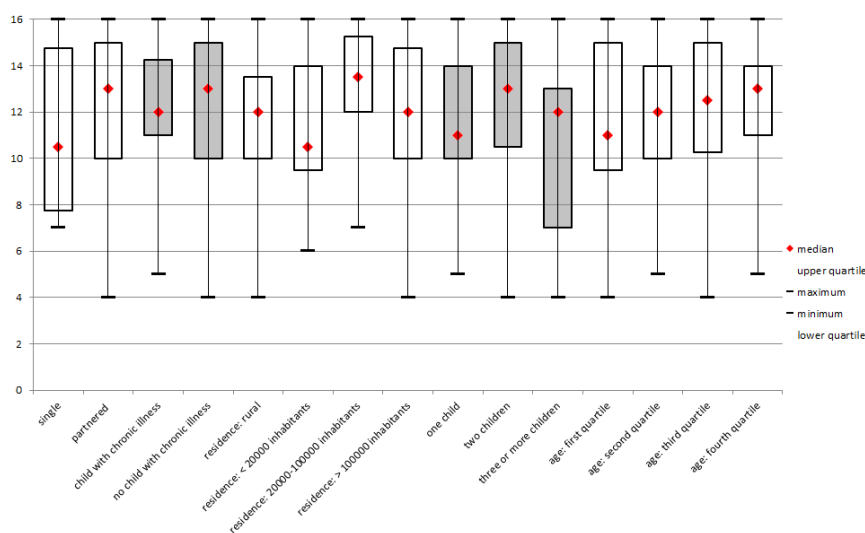
The aggregated answers to the 16 items resulted in a scale score for health literacy for each respondent. In the total sample, the mean score of the health literacy scale is 11,89, with a standard deviation of 3,04, an empirical minimum of 4 and a maximum of 16 points.

Following categorization of the scale scores as suggested by the literature, the rate of limited health literacy is as high as 54,6%, whilst 45,4% of respondents display sufficient health literacy.

It is important to note that either on the score scale or after categorization, there are no significant differences in the level of health literacy of Hungarian mothers across countries. Although child health indicators are different in these countries, infant mortality being much higher in Romania and Slovakia than in Hungary, the health literacy of ethnic Hungarian mothers is similar in all three countries.

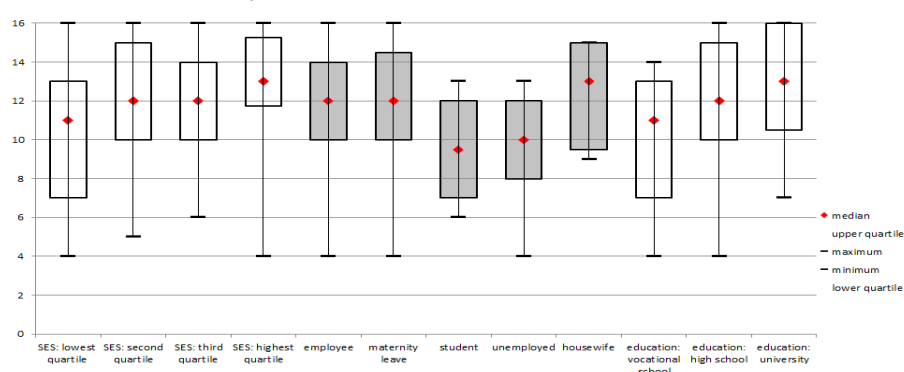
The boxplots in Figures 1 and 2 sum up the basic distributions of the HLS-EU-16 scale scores across the most important demographic and socio-economic characteristics. The median, the minimum and maximum values, the upper and lower quartile are displayed.

Figure 1 - HLS-EU-16 scores across demographic characteristics, N=675
Basic distribution of the HLS-EU-16 scores across demographic characteristics



First, regarding demographic characteristics (Figure 1), the lower health literacy scores are obvious in the case of the following groups: singles, caregivers of child(ren) with chronic illness, residents of small towns of below 20000 inhabitants, mothers of only one child, younger mothers. Larger health literacy score dispersions are typical for singles, caregivers of no child with chronic illness, mothers of three or more children, as well as for the youngest mothers.

Figure 2 - HLS-EU-16 scores across socioeconomic characteristics, $N=675$
Basic distribution of the HLS-EU-16 scores across socioeconomic characteristics



As far as socioeconomic features are concerned, the following groups display lower health literacy scores: respondents with lowest SES, students and unemployed, and mothers with low educational attainment. At the same time, respondents with lowest SES, students, and respondents with the lowest educational attainment (see Figure 2).

Knowing the main disparities across demographic and socioeconomic categories as revealed by descriptive statistics, the question is raised which variables predict sufficient health literacy. Our aim is to identify the probability of different categories of mothers to have sufficient health literacy, and through this, to denote those groups that are at risk of limited literacy.

In the logistic regression analysis below, the dependent variable is limited (0) and sufficient (1) health literacy.

Alleged predictors are demographic and socioeconomic features, as well as the presence/absence of a child with chronic illness in the family. The antecedent variables and their measurement levels as used in the model are:

Age: continuous

Partnership status: categorical: 0 = single (reference), 1 = has a partner

Number of children: continuous (1: reference)

Caring for a child with chronic illness or not: 0 = has no child with chronic illness, 1 = has at least one child with chronic illness

Place of residence: categorical: 1 = rural (reference), 2 = town with <20000 inhabitants, 3 = town with 20000-100000 inhabitants, 4 = town, >100000 inhabitants

Educational attainment: categorical: 1 = vocational school (reference), 2 = high school, 3 = university

SES, subjective socioeconomic status: continuous, measured on a scale of 1 to 10

Labour market status: categorical: 1 = employee (reference), 2 = on maternity leave, 3 = housewife, 4 = unemployed, 5 = student.

Table 1 - The determinants of mothers' health literacy. Logistic regression, N = 675

Explanatory variables	-2 Log likelihood: 174,912 Chi-square: 45,311, df: 11, p: 0,000 Nagelkerke R Square: 0,340		
	B	p	Exp(B)
Age (cont.)	0,097	0,043	1,259
Partnership status Reference: single			
Partnered	1,606	0,004	2,232
Number of children (cont.)	0,546	0,078	1,726
Caregiver for child with chronic illness Reference: no			
Has at least one child with chronic illness	-,575	0,030	0,563
Place of residence (reference: rural)		0,103	
< 20000 inhabitants	0,072	0,911	1,075
20000 - 100000 inhabitants	1,429	0,017	2,174
> 100000 inhabitants	0,760	0,117	2,137
Educational attainment (reference: vocational)		0,002	
High school	0,415	0,712	1,240
University	0,983	0,000	1,433
SES (cont.)	1,125	0,031	1,321
Labour market status (reference: employee)		0,476	
On maternity leave	0,255	0,556	1,290
Housewife	0,554	0,618	0,740
Unemployed	0,283	0,714	1,251
Student	0,478	0,874	0,899
Constant	-5,145	0,037	0,006

Source: own calculations, 2020

All in all, as the p value of the Chi-square test reveals, the predictors are jointly significant. The model explains 34% (Nagelkerke R^2) of the variance in health literacy and correctly classified 62,3% of cases. The statistics of the Wald test show statistical significance ($p < 0,05$) for the following predictors: age, educational attainment, socioeconomic status, partnership status and being the caregiver for a child with chronic illness. Further, although the place of residence is, on the whole, non-significant, it is significant for one dummy. The rest of variables: the place of residence, labour market status and the number of children did not significantly contribute to the model.

The logistic regression model measures the odds for sufficient health literacy controlled for other effects. Beta (Exp(B)) values greater than one indicate that, compared to the reference categories, the probability of sufficient health literacy increases, whereas values less than one suggest that this probability decreases.

The probability of sufficient health literacy increases by 1,259 (Exp(B)) for every year increase in the age of mothers. Partnered mothers are more than twice as likely (Exp(B)=2,232) to exhibit sufficient health literacy than single mothers. Being the caregiver for at least one child with chronic illness is associated with a reduction in the likelihood of reporting sufficient health literacy (Exp(B)=0,563). Respondents from middle size towns exhibit twice as high probability (Exp(B)=2,174) of having sufficient health literacy compared to respondents from rural places. The odds of belonging to the group with sufficient health literacy is 1,433 (Exp(B) value) times greater for highly educated mothers as opposed to those who had only achieved vocational education. Increasing socioeconomic status is associated with an increased likelihood of having sufficient health literacy (Exp(B)=1,321).

The number of children and the labour market status are non-significant with respect to mothers' health literacy.

Discussion

This analysis approached mothers' health literacy in two ways.

First, descriptive results reveal the self-reported factual knowledge deficiencies of mothers. The high rates of lack of information on vaccines sheds some light on the nature of vaccine incompletion in the region, where, unlike some developed countries, this phenomenon is not, or not yet, associated with high social status. In Hungary, Romania and Slovakia, lack of immunization for vaccine-preventable diseases rather still reflects the "classical" information disproportionality typical for low social status groups (Hanlon et al., 1988; Ahmad, Zahid & Jan, 2012; MacDonald et al., 2015).

The self-reported lack of information on disease treatment is particularly alarming in the context of the disease control of childhood-onset chronic dis-

eases, since children of parents with limited health literacy are at increased risk of relapse or of poor disease control (Hassan & Heptulla, 2010; Janisse, Naar-King & Ellis, 2010; Yin et al., 2010; Howe & Winterhalter, 2013; Johri et al., 2016; Cheng et al., 2016; Borges et al., 2017).

Our second approach to health literacy departed from the integrative theoretical concept of the European Health Literacy Project, which posits the processes of accessing, understanding, appraising and applying health-related information within the domains of healthcare, disease prevention and health promotion (Sørensen et al., 2012). On this theoretical basis, our research measured health literacy with the short version of the HLS-EU questionnaire.

This standardized method allows for some comparison. In the ethnic Hungarian mothers of Eastern Europe the proportion of limited health literacy is much higher than in representative samples in Germany (Jordan & Hoebel, 2015), Catalonia (Garcia-Codina et al., 2019) and Poland (Duplaga, 2020), but it is lower than in general practitioners' patients convenience sample in the surroundings of Florence, Italy (Lorini et al., 2019).

Within the group of Hungarian mothers, between respondents with a similar demographic and socioeconomic profile, age in itself can make a difference. Logistic regression fitted for the two outcomes of the HLS-EU-16 scale reinforced the positive impact of age on health literacy. In international research, most studies found that health literacy decreased with age (Jordan & Hoebel, 2015; Garcia-Codina et al., 2019). However, in Poland, limited HL occurred less frequently among the respondents aged 50–59 years than among those aged 18–29 (Duplaga, 2020). In the Netherlands and in the former East Germany, health literacy improved with age (Tiller et al., 2015; Van der Heide et al., 2013). One reason for the positive correlation between age and maternal health literacy was that older mothers tended to overconsume health information (Carolan, 2007). Our results show that the older a mother is, the more likely it is for her to have sufficient health literacy. The difference ($\text{Exp}(B)=1,259$) might seem negligible for a one-year age increase, but if aggregated, it leads to a considerable advantage of older mothers. For instance, a five-year age increase leads to the doubling, a ten-year increase to even more than the tripling of the probability of sufficient health literacy.

The chance of partnered mothers having sufficient health literacy is more than double that of single mothers. Put another way, the risk of single mothers to have limited health literacy is double compared to partnered ones. This handicap of single mothers, although not accentuated by health literacy literature, was revealed for single adults in Poland, too, where marital status was a significant antecedent of sufficient health literacy (Duplaga, 2020). Also in specific settings, single parents displayed lower health literacy in child oral health (Kumar, Kroon & Lalloo, 2014) and diabetes control (Ja-

nisse, Naar-King & Ellis, 2010), and children of single parents encountered more illness relapses than did children raised by both parents (Howe & Winterhalter, 2013). In ethnic Hungarian mothers in Eastern Europe, too, being a single mother is associated with a significant risk of limited health literacy. To date, this study is the first to assess a health literacy shortfall for single mothers in the Eastern European region, and identifying its reasons calls for further exploratory analysis. However, the disadvantages of single parents have been pointed out with respect to several other aspects, starting from deprivation, marginalization and poverty until work-life-imbalance, emotional problems and lower quality of life (Gotea & Busuioc, 2006; Sanduleasa et al., 2011; Czibere & Rácz, 2014).

It is most important to study parental health literacy with respect to child health outcomes. Hungarian mothers who care for at least one child with chronic illness are much less likely to have sufficient health literacy than mothers of healthy children. Although the nature of this association needs further reasoning and could best be identified with longitudinal analysis, this finding is crucial to our research and has far-reaching policy implications, as limited parental health literacy is harmful to child health (Hassan & Heptulla, 2010; Janisse, Naar-King & Ellis, 2010; Yin et al., 2010; Howe & Winterhalter, 2013; Johri et al., 2016; Cheng et al., 2016; Borges et al., 2017).

The mothers' place of residence, though included in most analyses, was a significant predictor of health literacy only in a setting outside of Europe, in Ghana (Amoah, 2018). In European settings, to our knowledge, when controlled for other variables, the place of residence did not increase the power of explanatory models, it did not add any plus to the knowledge on health literacy determinants. However, in our sample, respondents living in middle-size towns with 20000 to 100000 inhabitants display a significantly higher probability for sufficient health literacy than village-dwellers with a similar demographic and socioeconomic profile. This novel finding calls for further explanation.

As to the well-established knowledge of the social gradient in health literacy, in this population the odds for sufficient health literacy do not increase uniformly for all educational attainments. The increase in education is beneficial for health literacy only at the top of the social structure, i.e. for mothers with a university degree compared to those who completed vocational education.

Socioeconomic situation measured with the subjective social status is also a significant predictor of health literacy ($\text{Exp}(B)=1,321$). Considering two mothers on the two extreme poles of social status, the odds of the wealthiest having sufficient health literacy is threefold compared to the poorest ones. In other words, the risk of having limited health literacy is three times as high for the least affluent mothers than for the most affluent ones. These findings

are in line with the results of other studies carried out with the same methodology (Jordan & Hoebel, 2015; Tiller et al., 2015; Garcia-Codina et al., 2019; Almaleh et al., 2017). From socioeconomic variables, only labour market status did not prove to be a significant antecedent of health literacy, unlike in a recent Polish study, where employees and the self-employed displayed better health literacy than students and pupils (Duplaga, 2020).

Conclusions

The central aim of this study was to identify the socioeconomic and demographic predictors of sufficient health literacy and to assess the magnitude of their impact in the population of ethnic Hungarian mothers in Hungary, Romania and Slovakia. This was achieved through the logistic regression model which measured the odds ratios of predictor categories one by one, keeping constant all other independent variables.

The results partly reinforce the findings of previous European studies with respect to the antecedents of health literacy. There are huge differences between mothers with low and high education and socioeconomic status. In this way, disparities in health literacy largely reflect social inequalities. However, there are some unexpected results worthy of further consideration, and that we consider to be key findings of this analysis. The rationale of the explanatory analysis was precisely to identify at-risk categories of Hungarian mothers, among which younger and single mothers displaying low probabilities for sufficient health literacy are in the front line. Further, mothers who are caregivers of children with chronic illness have lower health literacy than those with healthy children, an issue that can have detrimental effects on child health and quality of life.

The hardships of young mothers, single mothers and mothers of chronically ill children should be treated as priority problems of parental health literacy.

Limitations

There are a number of limitations of this study. First, the potential for generalization of results is limited due to the online sampling technique. A lower level of health literacy might have been observed in the case of a more heterogeneous group of respondents, including those that are hard to reach with an online questionnaire. This deficit is, however, at least in part overcome by the weighting applied to the online, opt-in sample. Second, the problem of ethnic diversity could not be addressed in the context of this research, although it is a crucial issue in the region. Our study was carried out among Hungarian mothers in Hungary, Slovakia and Romania, where

in the latter two countries, Hungarians are in the ethnic minority. Research results are missing from the populations of ethnic Slovak and Romanian mothers. Third, the cut-off points for the limited and sufficient health literacy, although commonly used, might be somewhat arbitrary. In this respect, treating and analysing health literacy as a continuous variable could also be considered in the future. Fourth, it is a limitation of the study that our research design and sample size did not allow for differentiation among child chronic diseases. In spite of these limitations, the results of this study provide important new insights into the nature of social inequalities in health literacy and are intended to fill a long-standing shortfall in health research in the Eastern European region.

References

- Aharon, A.A., Nehama, H., Rishpon, S., & Baron-Epel, O. (2017). Parents with high levels of communicative and critical health literacy are less likely to vaccinate their children. *Patient Education and Counseling*, 100 (4), 768-775.
- Ahmad, S., Zahid, S.B., & Jan, A.Z. (2013). The impact of parental education and socioeconomic status on routine childhood vaccination: An observational study. *Journal of Postgraduate Medical Institute*, 27 (3), 280-284.
- Almaleh, R., Helmy, Y., Farhat, E., Hasan, H., & Abdelhafez, A. (2017). Assessment of health literacy among outpatient clinics attendees at Ain Shams University Hospitals, Egypt: a cross-sectional study. *Public Health*, 151, 137-145.
- Amoah, P.A. (2018). Social participation, health literacy, and health and well-being: A cross-sectional study in Ghana. *SSM Population Health*, 4, 263-270.
- Attwell, K., Meyer, S.B., & Ward, P.R. (2018). The Social Basis of Vaccine Questioning and Refusal: A Qualitative Study Employing Bourdieu's Concepts of 'Capitals' and 'Habitus'. *International Journal of Environmental Research and Public Health*, 15, 1044. doi:10.3390/ijerph15051044
- Borges, K., Sibbald, C., Hussain-Shamsy, N., Vasilevska-Ristovska, J., Banh, T., Patel, V., Brooke, J., Piekut, M., Reddon, M., Aitken-Menezes, K., McNaughton, A., Pearl, R.J., Langlois, V., Radhakrishnan, S., Licht, C.P.B., Piscione, T.D., Levin, L., Noone, D., Hebert, D., & Parekh, R.S. (2017). Parental health literacy and outcomes of childhood nephrotic syndrome. *Pediatrics*, 139 (3), 1-9. doi: 10.1542/peds.2016-1961
- Carolan, M. (2007). Health literacy and the information needs and dilemmas of first-time mothers over 35 years. *Journal of Clinical Nursing*, 16 (6), 1162-1172. doi: 10.1111/j.1365-2702.2007.01600.x
- Chari, R., Warsh, J., Ketterer, T., Hossain, J., & Sharif, I. (2014). Association between health literacy and child and adolescent obesity. *Patient Education and Counseling*, 94 (1), 61-66. doi: 10.1016/j.pec.2013.09.006
- Cheng, E.R., Bauer, N.S., Downs, S.M., & Sanders, L.M. (2016). Parent health literacy, depression, and risk for pediatric injury. *Pediatrics*, 138 (1), e 20160025. doi: 10.1542/peds.2016-0025
- Czibere, I. & Rácz, A. (2014). The Characteristics of Child Poverty in Hungary – Regional Inequalities and Regional Model Programs. *European Journal of Social Sciences*, 44, 248-256.

- Dawson, J., Smith, L., Deubert, K., & Grey-Smith, S. (2002). 'S'Trek 6: Referencing, not plagiarism. Retrieved October 31, 2002, from <http://studytrekk.lis.curtin.edu.au/>
- DeWalt, D. & Hink, A. (2009). Health literacy and child health outcomes: A systematic review of literature. *Pediatrics*, 124 (3), 265-274. doi: 10.1542/peds.2009-1162B
- Doustmohammadian, A., Keshavarz Mohammadi, N., Omidvar, N., Amini, M., Abdollahi, M., Eini-Zinab, H., Amirhamidi, Z., Esfandiari, S. & Nutbeam, D. (2019). Food and nutrition literacy (FNLIT) and its predictors in primary schoolchildren in Iran. *Health Promotion International*, 34 (5), 1002-1013. doi: 10.1093/heapro/day050
- Duplaga, M. (2020). Determinants and Consequences of Limited Health Literacy in Polish Society. *International Journal of Environmental Research and Public Health*, 17 (2), 642. doi: 10.3390/ijerph17020642
- Dutwin, D. & Buskirk, T.D. (2017). Apples to Oranges or Gala versus Golden Delicious? Comparing Data Quality of Nonprobability Internet Samples to Low Response Rate Probability Samples. *Public Opinion Quarterly*, 81 (21), 213–239.
- Gács, K.Zs., Kun, E., & Koltai, A.J. (2019). [Creating a new, culturally adapted questionnaire of parental health literacy: concept and experience]. *Egészségfejlesztés*, LX, 122-134. doi: 10.24365/ef.v60i5.429
- Garcia-Codina, O., Juvinyà-Canal, D., Amil-Bujan, P., Bertran-Noguer, C., González-Mestre, M.A., Masachs-Fatjo, E., Santaegènia, S.J., Magrinyà-Rull, P., & Saltó-Cerezuela, E. (2019). Determinants of health literacy in the general population: results of the Catalan health survey. *BMC Public Health*, 19, 1122. doi: 10.1186/s12889-019-7381-1
- Gele, A.A., Pettersen, K.S., Torheim, L.E., & Kumar, B. (2016). Health literacy: The missing link in improving the health of Somali immigrant women in Oslo. *BMC Public Health*, 16, 1134. doi: 10.1186/s12889-016-3790-6
- Gotea, M. & Busuioc, M. (2016). Maternal single-parent family in social risk situation. Psychosocial and behavioral characteristics. Bulletin of the Transilvania University of Braşov, Series VII: Social Sciences Law, 9, 97–108.
- Gustafsdóttir, S.S., Sigurdardóttir, A.K., Arnadóttir, S.A., Heimisson, G.T., & Mártensson, L. (2020). Translation and cross-cultural adaptation of the European Health Literacy Survey Questionnaire, HLS-EU-Q16: the Icelandic version. *BMC Public Health*, 20 (1), 61. doi: 10.1186/s12889-020-8162-6
- Hanlon, P., Byass, P., Yamuah, M., Hayes, R., Bennett, S. & M'Boge, B.H. (1988). Factors influencing vaccination compliance in peri-urban Gambian children. *The Journal of Tropical Medicine and Hygiene*, 91 (1), 29-33.
- Harrington, K.F., Zhang, B., Magruder, T., Bailey, W.C., & Gerald, L.B. (2015). The impact of parent's health literacy on pediatric asthma outcomes. *Pediatric Allergy, Immunology and Pulmonology*, 28 (1), 20-26. doi: 10.1089/ped.2014.0379
- Hassan, K., & Heptulla, R. (2010). Glycemic Control in Pediatric Type 1 Diabetes: Role of Caregiver Literacy. *Pediatrics*, 125 (5), e1104-1108. doi: 10.1542/peds.2009-1486
- Howe, C.J., & Winterhalter, E. (2013). Parent health literacy: risks and outcomes. *Journal of Pediatric Nursing*, 28 (5), 515–516. doi: 10.1016/j.pedn.2013.06.001
- Ismail, A.F., Ardini, Y.D., Mohamad, N., & Bakar, H.A. (2018). Association between parental oral health literacy and children's oral health status. *Revista Latinoamericana de Hipertensión*, 13 (3), 305-309.
- INSP (2019). Analysis of the evolution of communicable diseases under surveillance (Analiza evoluției bolilor transmisibile aflate în supraveghere. Raport pentru anul 2018). Bucharest: INSP.

- Janisse, H.C., Naar-King, S., & Ellis, D. (2010). Brief Report: Parent's Health Literacy among High-Risk Adolescents with Insulin Dependent Diabetes. *Journal of Pediatric Psychology*, 35 (4): 436–440. DOI: 10.1093/jpepsy/jsp077
- Johri, M., Subramanian, S.V., Koné, G.K., Dudeja, S., Chandra, D., Minoyan, N., Sylvestre, M.P. & Pahwa, S. (2016). Maternal health literacy is associated with early childhood nutritional status in India. *The Journal of Nutrition*, 146 (7), 1402–1410. doi: 10.3945/jn.115.226290
- Jordan, S. & Hoebel, J. (2015). Health literacy of adults in Germany-Findings from the 'German Health Update', wave 2013–2014. *European Journal of Public Health*, 25 (Suppl. 3).
- Khan, M., Hashim, M.J., King, J., Govender, R.D., Mustafa, H., & Al Kaabi, J. (2019). Epidemiology of Type 2 Diabetes – Global Burden of Disease and Forecasted Trends. *Journal of Epidemiology and Global Health*. doi: 10.2991/jeqh.k.191028.001
- Kučera, Z., Pelikan, J.M. & Šteflová, A. (2016). Health literacy in Czech population - Results of the comparative representative research. *Casopis lékařů českých*, 155 (5), 233-241.
- Kumar, S., Kroon, J., & Laloo, R. (2014). A systematic review of the impact of parental socio-economic status and home environment characteristics on children's oral health related quality of life. *Health and Quality of Life Outcomes*, 12, 41. doi: 10.1186/1477-7525-12-41
- Lee, J.Y. (2016). Maternal health literacy among low-income mothers with infants. Texas: University of Texas Libraries. Retrieved March 14, 2020, from <http://hdl.handle.net/2152/40335>
- Levin-Zamir, D., Baron-Epel, O.B., Cohen, V., & Elhayany, A. (2016). The association of health literacy with health behavior, socioeconomic indicators, and self-assessed health from a national adult survey in Israel. *Journal of Health Communication*, 21 (Suppl. 2), 61-68.
- Lorini, C., Santomauro, F., Grazzini M., Mantwill, S., Vettori, V., Lastrucci, V., Bechini, A., Boccalini, S., Bussotti, A., & Bonaccorsi, G. (2017). Health literacy in Italy: a cross-sectional study protocol to assess the health literacy level in a population-based sample, and to validate health literacy measures in the Italian language. *BMJ Open*, 7, 017812. doi:10.1136/bmjopen-2017-017812
- Lorini, C., Santomauro, F., Donzellini, M., Capecci, L., Bechini, A., Boccalini, S., Bonanni, P., & Bonaccorsi, G. (2018). Health literacy and vaccination: A systematic review. *Human Vaccines and Immunotherapeutics*, 14 (2), 478-488. doi: 10.1080/21645515.2017.1392423
- Lorini, C., Lastrucci, V., Mantwill, S., Vettori, V., Bonaccorsi, G., & the Florence Health Literacy Research Group. (2019). Measuring health literacy in Italy: a validation study of the HLS-EU-Q16 and of the HLS-EU-Q6 in Italian language, conducted in Florence and its surroundings. *Annali dell'Istituto Superiore di Sanità*, 55 (1), 10-18. doi: 10.4415/ANN_19_01_04
- MacDonald, N.E., & the SAGE Working Group on Vaccine Hesitancy I. (2015) Vaccine hesitancy: definition, scope and determinants. *Vaccine*, 33, 4161-4164. doi: 10.1016/j.vaccine.2015.04.036
- Meslé, F., Vallin, J. & Andreyev, Z. (2002). *Population* (English Edition), 57 (1), 157-197. doi: 10.2307/3246630
- Meslé, F. & Vallin, J. (2017). The End of East-West Divergence in European Life Expectancies? An Introduction to the Special Issue. *European Journal of Population*, 33, 615-627.
- Naghshineh, E., Golshiri, P., & Sichani, Z.H. (2017). Knowledge of mothers about puberty health in girls: A survey in the center of Iran. *International Journal of Travel Medicine and Global Health*, 5 (3), 102-106.
- Nolasco, A., Barona, C., Tamayo-Fonseca, N., Ángeles Irlles, M., Más, R., Tuells, J., & Pereyra-Zamora, P. (2018). [Health literacy: psychometric behaviour of the HLS-EU-Q16 questionnaire]. *Gaceta Sanitaria*, November. doi: 10.1016/j.gaceta.2018.08.006

- Patterson, C.C., Harjutsalo, V., Rosenbauer, J., Neu, A., Cinek, O., Skrivarhaug, T., Rami-Merhar, B., Soltesz, G., Svensson, J., Parslow, R.C., Castell, C., Schoenle, E.J., Bingley, P.J., Dahlquist, G., Jarosz-Chobot, P.K., Marčiulionytė, D., Roche, E.F., Rothe, U., Bratina, N., Ionescu-Tirgoviste, C., Weets, I., Kocova, M., Cherubini, V., Rojnic Putarek, N., de Beaufort, C.E., Samardzic, M., & Green, A. (2019). Trends and cyclical variation in the incidence of childhood type 1 diabetes in 26 European centres in the 25-year period 1989–2013: a multicentre prospective registration study. *Diabetologia*, 62, 408–417. doi: 10.1007/s00125-018-4763-3
- Paula, J.S., Ambrosano, G.M., & Mialhe, F.L. (2015). The impact of social determinants on schoolchildren's oral health in Brazil. *Brazilian Oral Research*, 29, 1-9. doi: 10.1590/1807-3107BOR-2015.vol29.0098.
- Pelikan, J.M., Röthlin, F., & Ganahl, K. (2014). Measuring Comprehensive Health Literacy in General Populations: Validation of Instrument, Indices and Scales of the HLS-EU Study. In Proceedings of the 6th Annual Health Literacy Research Conference, Bethesda, MD, USA, 3–4 November 2014. Retrieved March 14, 2020, from <http://www.bumc.bu.edu/healthliteracyconference/files/2014/06/Pelikan-et-al-HARC-2014-fin.pdf>
- Rouquette, A., Nadot, T., Labitrie, P., van den Broucke, S., Mancini, J., Rigal, L., & Ringa, V. (2018). Validity and measurement invariance across sex, age, and education level of the French short versions of the European Health Literacy Survey Questionnaire. *PLOS ONE*, 13 (12), 1-15.
- Sanders, L.M., Thompson, V.T., & Wilkinson, J.D. (2007). Caregiver Health Literacy and the Use of Child Health Services. *Pediatrics*, 119 (1), e86-92. doi: 10.1542/peds.2005-1738
- Sănduleasa, B., Matei, A., Ghența, M. & Racoceanu, N. (2011). Romanian single-parent families: Quality of life. *International Scholarly and Scientific Research & Innovation*, 5, 508–514.
- Scotten, M. (2015). Parental Health Literacy and Its Impact on Patient Care. *Primary Care: Clinics in Office Practice*, 42 (1), 1-16. doi: 10.1016/j.pop.2014.09.009
- Shone, L.P., Conn, K.M., Sanders, L., & Halterman, J.S. (2009). The Role of Parent Health Literacy Among Urban Children with Persistent Asthma. *Patient Education and Counselling*, 75 (3), 368-375. doi: 10.1016/j.pec.2009.01.004
- Sørensen, K., Pelikan, J.M., Röthlin, F., Ganahl, K., Slonska, Z., Doyle, G., Fullam, J., Kondilis, B., Agraftotis, D., Uiters, E., Falcon, M., Mensing, M., Tchamov, K., van den Broucke, S., Brand, H., & HLS-EU Consortium (2015). Health literacy in Europe: comparative results of the European health literacy survey (HLS-EU). *European Journal of Public Health*, 25 (6), 1053-1058. doi: 10.1093/eurpub/ckv043
- Storms, H., Claes, N., Aertgeerts, B., & van den Broucke, S. (2017). Measuring health literacy among low literate people: an exploratory feasibility study with the HLS-EU questionnaire. *BMC Public Health*, 17, 475. doi: 10.1186/s12889-017-4391-8
- Tiller, D., Herzog, B., Kluttig, A., & Haertlin, J. (2015). Health literacy in an urban elderly East-German population – results from the population-based CARLA study. *BMC Public Health*, 15, 883. doi: 10.1186/s12889-015-2210-7
- UNICEF. (2015). Levels and trends in child mortality 2015. New York. Retrieved April 2, 2020, from https://www.who.int/gho/child_health/mortality/mortality_under_five_text/en/
- Vandenbosch, J., van den Broucke, S., Vancorenland, S., Avalosse, H., Verniest, R., & Callens, M. (2016). Health literacy and the use of healthcare services in Belgium. *Journal of Epidemiol Community Health*, 70 (10), 1032-1038. doi: 10.1136/jech-2015-206910
- Van der Heide, I., Rademakers, J., Schipper, M., Droomers, M., Sørensen, K., & Uiters, E. (2013). Health literacy of Dutch adults: a cross sectional survey. *BMC Public Health*, 13, 179. doi: 10.1186/1471-2458-13-179

- Veres, V. (2012). The minority identity and the idea of the 'unity' of the nation: the case of Hungarian minorities from Romania, Slovakia, Serbia and Ukraine. *Identities – Global Studies in Culture and Power*, 22 (1), 88-108.
- Wangdahl, J.M., Dahlberg, K., Jaensson, M., & Nilsson, U. (2019). Psychometric validation of Swedish and Arabic versions of two health literacy questionnaires, eHEALS and HLSEU-Q16, for use in a Swedish context: a study protocol. *BMJ Open*, 9. doi:10.1136/bmjopen-2019-029668
- Zoellner, J.M., Hill, J., You, W., Brock, D., Frisard, M., Alexander, R., Silva, F., Price, B., Marshall, R., & Estabrooks, P.A. (2017). The influence of parental health literacy status on reach, attendance, retention, and outcomes in a family-based childhood obesity treatment program, Virginia, 2013–2015. *Preventing Chronic Disease*, 14, 87. doi: 10.5888/pcd14.160421
- Yin, H.S., Forbis, S.G., & Dreyer, B.P. (2007). Health literacy and pediatric health. *Current Problems in Pediatric and Adolescent Health Care*, 37, 258-286.
- Yin, H.S., Johnson, M., Mendelsohn, A.L., Abrams, M.A., Sanders, L.M., & Dreyer, B.P. (2009). The Health Literacy of Parents in the United States: A Nationally Representative Study. *Pediatrics*, 124 (Supplement 3), 289-298. doi: 10.1542/peds.2009-1162E
- Yin, H.S., Mendelsohn, A.L., Wolf, M.S., Parker, R.M., Fierman, A., van Schaick, L., Bazan, I.S., Kline, M.D., & Dreyer, B.P. (2010). Parents' medication administration errors: Role of dosing instruments and health literacy. *Archives of Pediatrics & Adolescent Medicine*, 164, 181-186. doi: 10.1001/archpediatrics.2009.269
- WHO/Europe. (2016). Baseline Survey for the European Child and Adolescent Health Strategy. WHO European Region. Copenhagen. Retrieved March 21, 2020, from https://www.who.int/topics/child_health/factsheets/en/
- WHO/Europe. (2019). Technical Briefing on Child and Adolescent Health 69th session of the WHO Regional Committee for Europe. Copenhagen, 16–19 September 2019. Retrieved March 21, 2020, from https://www.who.int/topics/child_health/factsheets/en/
- UN IGME (2019). United Nations Inter-agency Group for Child Mortality Estimation. Most recent child mortality estimates. Retrieved August 2, 2020, from <https://childmortality.org/>
- WHO/Europe. (2018). Hospitalization rate for children under 5 years. Retrieved August 2, 2020, from https://gateway.euro.who.int/en/indicators/cahb_survey_25-hospitalisation-rate-for-children-under-5/

Appendix: Items and response options for the HLS-EU-16 health literacy scale

On a scale from very easy to very difficult, how easy would you say it is to.....?

Answer options: very easy (1), easy (2), difficult (3), very difficult (4), don't know/no answer (5)

- Find information on treatment of illnesses that concern you
- Find out where to get professional help when you are ill
- Understand what your doctor tells you
- Understand your doctor or pharmacist's instructions on how to take a prescribed medicine
- Judge when you may need to get a second opinion from another doctor
- Use information the doctor gives you to make decisions about your illness
- Follow instructions from your doctor or pharmacist
- Find information on how to manage mental health problems like stress and depression
- Understand health warnings about behaviour such as smoking, low physical activity and drinking too much
- Understand why you need health screenings
- Judge if the information on health risks in the media is reliable
- Decide how you can protect yourself from illness based on information in the media
- Find out about activities that are good for your mental well-being
- Understand advice on health from family members or friends
- Understand information in the media on how to become healthier
- Judge which everyday behaviour is related to your health