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Title: Does health literacy explain regional health disparities among adolescents in Finland?

Year: 2021

Version: Accepted version (Final draft)

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Please cite the original version:

Simonsen, N., Wackström, N., Roos, E., Suominen, S., Välimaa, R., Tynjälä, J., & Paakkari, L. (2021). Does health literacy explain regional health disparities among adolescents in Finland?. *Health Promotion International*, 36(6), 1727-1738. <https://doi.org/10.1093/heapro/daaa122>

Please cite this article as:

Simonsen N, Wackström N, Roos E, Suominen S, Välimaa R, Tynjälä J, Paakkari L. Does health literacy explain regional health disparities among adolescents in Finland. **Health Promotion International** 2021;36:1727–1738; doi: 10.1093/heapro/daaa122

Does health literacy explain regional health disparities among adolescents in Finland?

Health literacy (HL) – as a broad range of health-related competencies – has been proposed to be a promising construct in understanding health disparities better, also among adolescents. Several factors have been found to explain differences in adolescents' HL levels; however, not much is known about how different regions of a country or majority/minority status is associated with HL, or whether HL is associated with regional health disparities. The aim of this study was to examine and compare HL and health levels among majority- and minority-language-speaking adolescents living in different regions of Finland, and to explore if HL explains regional health disparities, taking into account other important structural stratifying factors. The study uses Health Behaviour in School-aged Children survey data, collected among 13- and 15-year-old pupils in Finnish- and Swedish-speaking schools in Finland in 2014 (N=3853/1123; 85/83%). Findings suggest that regional differences in HL levels and regional health disparities exist in both language groups. Health disparities were present in the Finnish-speaking sample among boys, the proportion rating their health as excellent ranging from 23 to 31% across regions, and in the Swedish-speaking sample among girls, the corresponding numbers ranging from 13 to 20%. In addition to other important structural stratifying factors, comprehensive HL explains these regional health disparities. This study adds to prior studies on the role of HL as a modifiable health resource by showing that regional health disparities among adolescents can partially be attributed to corresponding HL differences.

Keywords: health literacy, self-rated health, adolescents, regional health disparities

Introduction

Good health is a resource for everyday life in adolescence, and lays the foundation for health outcomes in later life (Inchley et al., 2016; Viner et al., 2012; WHO, 1986). The decreased ratings of health among adolescents in many European countries (Cavallo et al., 2015) consequently are worrying. One possible explanation to these findings, proposed by the researchers, are the socioeconomic difficulties in Europe during the first decade of the 21st century. The economic crisis that started in 2007-2008 revealed clear social and economic, and, accordingly, health inequities between as well as within countries (Marmot et al., 2012) – regional health disparities within countries being one important public health issue (Kroll et al., 2017). While findings related to current time trends in health and wellbeing among adolescents are partly inconsistent, research findings show that socioeconomic differences have increased in many health domains (Elgar et al., 2015). Health literacy (HL) is a potential and modifiable health resource, also with regard to socioeconomic disparities (Stormacq et al., 2018), which might empower adolescents and eventually have a positive influence on health.

Within the field of public health, and health promotion, especially, where the conceptualizations of HL move beyond skills of reading, writing and numeracy, HL can be seen as an ability of “...placing one's own health and that of one's family and community into context, understanding which factors are influencing it, and knowing how to address them” (Sørensen et al., 2012). Although the interest for HL, as defined by Sørensen et al. (2012), as an explanatory factor for health has grown only recently, it is already regarded quite a well-established determinant of individual health outcomes (Sentell et al., 2014; Kickbusch et al., 2013). However, since studies previously have focused mainly on the adult population, less is known about HL among adolescents (Sansom-Daly et al., 2016; Sentell et al., 2014).

Consequently, few studies on HL among adolescents have explored comprehensive HL (Sansom-Daly et al., 2016). A recent review on associations between HL and health behaviours

among adolescents, found that the majority of studies assessed basic (functional) health literacy, and, although there was a relationship, the researchers argued for measures that assess all aspects of HL in order to determine this association (Fleary et al., 2018). Moreover, given the timing of developmental characteristics among adolescents, the importance of acknowledging sex and age differences in HL in future studies was underscored (Fleary et al., 2018). As concerns health outcomes among youth, there is initial evidence related to comprehensive HL and its association with several health indicators, including self-rated health (Paakkari et al., 2019).

While HL is seen to originate in and help shape the environment in which people live (Kickbusch et al., 2013), only few studies have examined HL within this broader context. Furthermore, adolescents – whose HL is likely to be greatly affected by their social context – are especially understudied (Sentell et al., 2017). Additionally, as there might be both societal and cultural differences in HL (Manganello, 2008), studies focusing on specific population groups are needed to gain a deeper understanding about the influence of context on HL (Paakkari et al., 2018).

Research setting and aims of the study

To address HL within a broader context, we make use of nationally representative data collected in Finland in 2014 to study possible regional differences in HL levels and in health, both among Finnish- and Swedish-speaking adolescents. A few reports suggest that there might be regional health differences among adolescents in Finland (Simonsen et al., 2016; Luopa et al., 2014). Finnish and Swedish are the two main official languages in Finland – representing cultural or social groups more than ethnic ones – with Swedish speakers being a minority (5.3% of the population). According to a recent WHO-report, there is a clear need to strengthen the evidence base for HL at all societal levels, including local levels, in order to ensure that policies address needs specific to different contexts (Rowlands et al. 2018).

Previous studies on HL have explored comprehensive HL levels among Finnish-speaking adolescents, and the levels were higher among girls, and higher among 15-year than 13-year-olds. The strongest explanatory variables for higher HL were good school achievement in the first language and academic educational aspirations, though they varied across gender and age groups (Paakkari et al., 2018). These findings are consistent with an international review that found disadvantaged social and socioeconomic conditions in general to contribute to low HL levels, and low socioeconomic status – particularly educational attainment – to be the most important determinant of HL (Stormacq et al., 2018).

HL has been suggested to be an independent factor explaining health disparities, and proposed as a modifiable factor of socioeconomic disparities in health (Paakkari et al., 2019; Stormacq et al., 2018). Whether HL might explain regional health disparities is not known. Furthermore, to our knowledge, earlier studies have not examined whether comprehensive HL levels among adolescents vary in different regions of a country, nor whether there are differences in this regard between majority and minority cultures.

Thus, the aim of this study was (i) to examine and compare HL and health levels among Finnish- and Swedish-speaking adolescents living in different regions of Finland, and (ii) to explore if HL explains regional health differences in these two language groups, taking into account especially the possible moderating effect of gender, but also other important structural stratifying factors.

Methods

Data collection

The study is part of the international Health Behaviour in School-aged Children (HBSC) - study, in which survey data on adolescents' perceived health, health behaviour and social contexts are collected every fourth year (Inchley et al., 2016). Nationally representative data

for this study were collected in 2014 in basic education schools in Finland that had Finnish or Swedish as the main teaching language (here after referred to as Finnish- and Swedish-speaking schools). Schools were selected from the Finnish school register by using a cluster-sampling program, and in a selected school, the participating class was chosen randomly. School principals of the selected schools decided whether their school participated in the study. Students filled in the questionnaire under supervision in class, they were aware about the confidentiality of the data, and they responded voluntarily and anonymously. The response rate was 85% in Finnish-speaking and 83% in Swedish-speaking schools. Students included in the present analyses were 7th and 9th graders, approximately 13- and 15-year-olds.

Study variables

Self-rated health was assessed by a global question: “Would you say your health is...?” with four response options. We dichotomized the variable into: 1) poor, fair or good health, and 2) excellent health. Because of variations in the slant of the word “fair” across languages, Schnohr et al. (2016) recommend the response option “good” to be combined with “fair” and “poor” when the research interest is on positive health, and thus to examine excellent health when comparing different language groups.

HL was assessed with the Health Literacy for School-aged Children (HLSAC) instrument (Paakkari et al., 2016), which focuses on subjective competence. HLSAC consists of ten items, two from each of five predetermined essential components of HL, which are proposed to be theoretical knowledge, practical knowledge, critical thinking, self-awareness and citizenship (Paakkari and Paakkari, 2012). The items took the form “I am confident that...” and were rated on a 4-point Likert scale (1 = not at all true ... 4 = absolutely true). In line with Paakkari et al. (2017; 2018), responses were scored, summed (range: 10–40; Cronbach’s alpha 0.93) and divided into three categories: low (score 10–25), moderate (26–35), and high HL (36–40).

Language, i.e. Finnish or Swedish, was based on the main teaching language of the school. *Living region* was based on the area for the school. For the Finnish-speaking sample, this variable was categorized into Southern Finland, Central Finland, and Northern Finland. For the Swedish-speaking students, the variable was due to local cultural differences categorized into: Southern Finland and Ostrobothnia/Åland. The majority of Swedish-speaking people in Finland live in these regions, Ostrobothnia (part of western Central Finland) and Åland being relatively strongly Swedish-speaking areas, whereas Swedish speakers in Southern Finland are a small minority.

In addition to language and living region, the other stratifying factors were gender, age, socioeconomic status (SES) and educational aspirations. We assessed SES in two ways: based on participants' perceived SES and based on the revised Family Affluence Scale (FASIII) (Torsheim et al., 2016). *Perceived SES* was assessed by the question "How well off do you think your family is?", with five response options. The variable was categorized into: 1) not very well or not at all well off, 2) average, and 3) very well or well off. For correlation and regression analyses, category 1 and 2 were combined. *FASIII* involves six items that measure the material affluence of the family. A variable was created based on responses and categorized into: low (20%), medium (60%), and high (20%) affluence.

Educational aspirations were assessed by asking the students what they would do after completing basic education. The question had seven response options, which before analysis were categorised into: 1) academic ("upper secondary school" or "double examination" i.e. upper secondary school and vocational school), 2) vocational ("vocational school or other vocational training" or "an apprenticeship"), and 3) other ("get a job", "be unemployed" or "don't know"). Because of low frequency in the third category, it was combined with category 2 in correlation and regression analyses.

Statistical analyses were performed using SPSS version 25. In descriptive analyses, crosstabs, Chi-square-test and Spearman's correlation were used. Associations between HL, stratifying factors and self-rated health were tested in age-adjusted logistic regression analyses, separately for Finnish- and Swedish-speaking adolescents and for genders. Since the sample included a pre-planned overrepresentation of Swedish-speaking students, the data was weighted in statistical analyses that included both language groups (students from Finnish/Swedish-speaking schools 1.24/0.26). The significance level was set at $p < 0.05$.

Results

Characteristics of the sample

The participants were students from Finnish- and Swedish-speaking basic education schools in Finland (N=4976). The proportion of boys was 49.6% (n=2470) and girls 50.4% (n=2506); 50.2% (n=2500) were 13-year-old and 49.8% (n=2476) 15-year-old. Of the participants, 77.4% (n=3853) were Finnish and 22.6% (n=1123) Swedish speaking. Of the Finnish-speaking adolescents, 44.9% lived in Southern Finland, 36.8% in Central Finland, and 18.3% in Northern Finland. Of the Swedish-speaking adolescents, 59.5% lived in Southern Finland, and 40.5% in Ostrobothnia or Åland (Table 1).

There were regional differences in perceived SES and FASIII among Finnish-, but not among Swedish-speaking adolescents (Table 1). With regard to perceived SES, a smaller proportion of Finnish-speaking adolescents living in Central Finland thought that their family was well or very well off compared to those living in the two other regions ($p < 0.05$). Whereas, according to FASIII, the Finnish-speaking adolescents living in Northern Finland had the lowest SES. Moreover, there were regional differences in educational aspirations. In both language groups, adolescents living in Southern Finland more often had academic educational aspirations ($p < 0.001$).

[Insert Table 1. around here]

Descriptive results: Health and health literacy levels

In the total sample, 23.0% rated their health as excellent. There were no significant differences between the language groups in the proportion perceiving they had an excellent health; this finding was valid for the sample in general and when running analysis separately for boys and girls. There were, however, regional differences in self-rated health in both language groups (Table 2). In the Finnish-speaking sample, the proportion rating their health as excellent was smaller among those living in Central Finland compared to those living in the two other regions ($p < 0.05$). When running analysis separately for genders, differences were significant for boys ($p < 0.05$ and $p < 0.01$, respectively) but not for girls. Swedish-speaking adolescents living in Southern Finland rated their health as excellent more often than those living in the more Swedish-speaking region did ($p < 0.05$). When running analysis separately for genders, the difference was significant for girls only ($p < 0.05$).

In the total sample, 33.0% had a high, 57.1% a moderate and 9.9% a low HL. There were no significant differences between Finnish- and Swedish-speaking adolescents: this finding was valid for the sample in general and when running analysis separately for genders. Between regions there were, however, differences in HL levels in both language groups (Table 2). In the Finnish-speaking sample, there were small but statistically significant differences between Southern and Northern Finland ($p < 0.05$). However, when running analysis separately for boys and girls, the differences were not statistically significant. In the Swedish-speaking sample, adolescents living in Southern Finland more often had a high HL compared to those living in the more Swedish-speaking region ($p < 0.001$), also when running analysis separately for boys ($p < 0.001$) and girls ($p < 0.01$).

[Insert Table 2. around here]

Correlations between study variables

Before final logistic regression analyses, Spearman's correlations between variables were explored. All variables, except age, and, in the Swedish-speaking sample, FASIII, correlated significantly with self-rated health. Of the two variables that measured family's SES (perceived SES and FASIII), we therefore chose perceived SES for final logistic regression analyses.

Moreover, we explored possible interactions between background variables, HL and self-rated health. There were statistically significant interactions between the effects of gender and HL on self-rated health; and among girls, the effect of language and HL on self-rated health were near statistical significance. The effect of HL on self-rated health was stronger among girls, and somewhat stronger among Finnish- than among Swedish-speaking girls.

Health literacy, structural stratifying factors and regional health differences

Based on the interaction effects, and as the regional health differences differed among the two language-groups according to gender, multivariate logistic regression analysis was run separately for the Finnish- and Swedish-speaking sample and separately for boys and girls (Table 3 and 4).

In the Finnish-speaking sample, there were regional differences in self-rated health among boys, which persisted when adjusting for HL, perceived SES or educational aspirations in age-adjusted regression analyses (Table 3, models 2-4). In the fully adjusted model, the regional differences were eliminated. Moderate and high HL, higher perceived SES and academic educational aspirations were independently and positively associated with perceived excellent health among boys (model 5), and girls, as well (Table 4, model 5).

In the Swedish-speaking sample, the regional differences in self-rated health that were present among girls persisted when adjusting for perceived SES (Table 4, model 3). When adjusting for HL or educational aspirations, however, the difference between regions was eliminated

(model 2 and 4). In the fully adjusted model, high HL, higher perceived SES and academic educational aspirations were associated with perceived excellent health (model 5). Among Swedish-speaking boys, only high HL and academic educational aspirations were independently associated with excellent health (Table 3, model 5).

[Insert Table 3. and 4. around here]

We also run multivariate age-adjusted logistic regression analyses separately for boys and girls in the total – nationally representative – sample, and included the language variable (data not shown). Only when adjusting for all stratifying factors, the regional health differences that were present among boys – but not among girls – were eliminated. In the fully adjusted models, in both these genders, moderate and high HL, higher perceived SES and academic educational aspirations, but not language, were all independently and positively associated with perceived excellent health.

Discussion

To the best of our knowledge, this is the first study examining comprehensive HL levels among adolescents from a regional perspective in a country – in this case, a bilingual country – and whether HL explains regional health disparities, when considering other important structural stratifying factors, with a special focus on majority and minority language groups. Findings showed regional differences in HL levels, especially in the Swedish-speaking minority group, where differences were clear and present among both boys and girls. Findings also showed regional health disparities, which manifested differently in the two language groups. In the Finnish-speaking sample, health disparities were present among boys, and in the Swedish-speaking sample among girls. In both language groups, and in the total nationally representative sample, HL was an independent factor in explaining regional health disparities and higher HL was a predictor of self-rated excellent health.

Reducing inequalities in health is an important target for public health. It is especially important with concern to adolescents, as inequalities in adolescence might predict future inequalities in adult health (Elgar et al., 2015). The findings of the current study showed that regional health disparities exist among adolescents even in a Nordic welfare state like Finland, and also when adjusting for perceived SES. In both language groups, adolescents living in the central part of Finland (including also Åland Islands as concerns the Swedish speakers) had the lowest ratings of health.

This finding partly mirrors findings on health inequalities in the Finnish population. Statistics show that there are quite large differences between and within regions in Finland, for example in morbidity, and that the morbidity increases when moving from southern and western Finland towards the north-east. The reasons for this are found in factors such as lifestyles, unemployment, education, financial situation, genetics and health care operations (THL 2019). Overall, the municipalities at the coastal areas in the southern and western part of Finland, as well as Åland Islands, have the healthiest population (THL 2019). However, findings of the current study, as regards the Swedish speakers, showed that, contrary to our assumption, a lower proportion of the Swedish-speaking girls in the coastal area of western Central Finland, including Åland Islands – i.e. the more Swedish-speaking region – rated their health as excellent, as compared with those living in the southern part of Finland, where Swedish speakers are a low minority. Higher HL levels and higher-level educational aspirations among adolescents in the southern part of Finland seem to explain the difference.

HL has been proposed as a modifiable risk factor of socioeconomic disparities in health (Stormacq et al., 2018), or, as we would like to call it, a modifiable health resource or asset. According to our findings, there were – in addition to regional health disparities – regional differences in HL levels among adolescents, especially so among the minority-language speakers. In the Swedish-speaking sample, boys and girls living in Southern Finland had clearly

higher HL compared to those living in the more Swedish-speaking region. HL has been described as a main outcome of health education and communication activities (Nutbeam, 2000) and schools are undoubtedly one important arena for developing health competences (Kickbusch, 2008; Leger et al., 2001). In Finland, regional differences in health education learning outcomes have been reported (Summanen, 2014), which may reflect HL to some degree. However, the evaluation found no significant regional differences among students from Swedish-speaking schools, as we did in HL levels, which suggests that health education in schools stands for only part of adolescents' HL, as also proposed by, for example, Kickbusch et al. (2013). On the other hand, the regions in the evaluation were not the same as we used in the current study.

As concerns learning outcomes in general, regional differences in Finland have traditionally been small. However, the PISA (Programme for International Student Assessment) 2015 survey found systematic and clear differences between regions (Nissinen and Vuorinen, 2018): students in the capital area in the southern part of Finland had the highest scores in the assessed school subjects. Differences were attributed to family SES and cultural capital, as well as educational and professional aspirations. These factors are also key determinants of health (Marmot et al., 2012) and most of them found to be determinants of HL (Stormacq et al., 2018). Rights to equity in the social determinants is the foundation of the right to health (Marmot et al., 2012) at a regional level, as well. HL, especially, is a modifiable health resource, and, thus, it would be important to ascertain equal opportunities for health competence learning in schools in different parts of a country.

However, as said earlier, apart from health education in schools, also the larger context may influence HL (Kickbusch et al. 2013), especially as regards comprehensive HL. Overall, educational aspirations might be regarded a proxy indicator of the social context. In Southern Finland, over 65% of adolescents had academic educational aspirations, compared to 55 to 58%

in the other regions. This might partly be due to perceived possibilities for academic secondary education studies, as well as for further academic studies and employment, and partly due to customs or cultural differences. Findings show that at least the school environment, family and individual factors are associated with level of educational aspirations (Geckova et al., 2010), which in turn is a strong explanatory factor for HL (Paakkari et al., 2018). In the current study, the correlation between HL and educational aspirations was rather modest, but somewhat stronger in the Swedish-speaking sample (Spearman's Rho 0.21) than in the Finnish-speaking (0.18). In both language groups, HL and educational aspirations were independently associated with self-rated health. Not only individual HL but also community HL seem to be distinct correlates of individual general health status, as concerns adults (Sentell et al., 2014). Whether the social context in the form of perceived educational possibilities and employment possibilities is associated with community HL, and how this influences adolescents' HL, especially comprehensive HL, needs further studies.

We based our division of regions – as regards the Swedish-speaking sample – on the share of Swedish speakers, that is, regions of Finland with a higher proportion of Swedish speakers, contra regions where Swedish speakers are a low minority. Earlier studies, among adults, have suggested that stronger social capital might explain the better health outcomes found among the Swedish-speaking population in Finland (Hyypä and Mäki, 2003), and one could assume that social capital might be stronger and, thus, health outcomes better especially among Swedish-speaking adolescents in the more Swedish-speaking region. Findings on health outcomes among adolescents are, however, inconsistent, and according to a recent (Simonsen et al., 2018) as well as the present study, there were no differences in self-rated health between the language groups. Still, social capital might have positive associations with HL. Studies have shown that social participation indirectly predicted adults' wellbeing and health through HL (Amoah, 2018), and that adolescents who participate in sport clubs have higher HL (Paakkari et al.,

2017). Thus, the context, in the form of social participation and activities, and, possibly, opportunities to participate in decision-making in these contexts, might influence HL. We are not aware of whether there are regional differences related to social participation among adolescents in Finland; however, there might be differences between urban and rural areas of the country. Studies have for example found that local voluntary associations in more urban municipalities might engage more in health promotion activities (Simonsen, 2013). Whether the context in this regard has an influence on HL levels among adolescents would be worth further exploration. Moreover, the social context has changed during the last years, and certain kinds of social media use might be one way of acquiring positive social capital (Utz and Muscanell, 2015) and might influence HL. As concerns health information, studies show that adolescents today use several sources, such as the internet and other media, besides school-based information (Sansom-Daly et al., 2016).

In sum, from a health promotion viewpoint, health creation is a process of increasing people's control over their health and its determinants (WHO, 1986). An adequate HL level might empower adolescents to become more engaged with health issues, both as concerns themselves and their families and communities (Bröder et al., 2018). HL also seems to be an independent factor in explaining regional health disparities among adolescents. Promoting adequate comprehensive HL levels among adolescents in all regions of a country, possibly with a focus on different SES groups – especially with regard to educational career paths – could be one way to promote health and equity in health. Further studies are needed concerning the influence of context on HL among adolescents. For now, it seems that HL levels might vary in different regions of a country. Moreover, the strength of the effect of HL on health might vary inside a country by gender or minority group, for example – not only by national context (Pelikan et al., 2018).

Strengths and limitations

This study has a large sample size and excellent response rates, which are methodological strengths, and thus the findings can be generalized to adolescents in Finland. Whether regional differences – in health and HL – exist among adolescents in other countries and whether HL explains regional health differences where they exist would be worth studying.

The HBSC-data are of overall high quality, and we used a validated instrument to measure comprehensive HL. The cross-sectional study design is the strongest limitation of this study, and conclusions about the direction of influences cannot be made. In the regression analyses, when stratifying the sample according to both gender and language, the reference group for the HL variable, i.e. low HL, was rather small as regards girls, with subsequent quite wide confidence intervals. However, the cut-points for classifying the HL variable have been set by an expert-group (Paakkari et al., 2018) and cannot be changed.

The social determinants of health are manifold. In this study, we were able to adjust for stratifying factors such as gender, age, perceived SES, educational aspirations, language and living region. Still, there are differences for example in living conditions between and within the regions that we were only partly able to adjust for. Moreover, we did not include important variables like lifestyle and social network variables. In this paper, we were interested especially in the influence of the broader context on HL, and thus in the level of equity in HL and in health at regional levels – and moreover in different population groups – within a country, having Finland and its two language groups as an example. More studies are needed on factors in regions or communities influencing HL levels, as well as if some of the dimensions of HL are more critical in explaining health disparities.

Conclusions

This study adds to findings of prior studies on the role of HL as a modifiable health resource by showing that regional health disparities among adolescents in a bilingual country can partially be attributed to corresponding HL differences.

Acknowledgements: This study is part of a joint research project by Folkhälsan Research Center and the Faculty of Sport and Health Sciences of the University of Jyväskylä.

Funding: The study was supported by grants from The Swedish Cultural Foundation in Finland, and National Institute for Health and Welfare, Finland

References

- 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.
- Bröder J., Okan O., Bauer U., Bruland D., Schlupp S., Bollweg T. M. et al. (2017) Health literacy in childhood and youth: a systematic review of definitions and models. *BMC Public Health*, 17(1), 361.
- Elgar F. J., Pfortner T., Moor I., De Clercq B., Stevens G. W. J. M. and Currie C. (2015) Socioeconomic inequalities in adolescent health 2002–2010: a time-series analysis of 34 countries participating in the Health Behaviour in School-aged Children study. *The Lancet*, 385(9982), 2088-2095.
- Fleary S. A., Joseph P. and Pappagianopoulos J. E. (2018) Adolescent health literacy and health behaviors: A systematic review. *Journal of Adolescence*, 62, 116-127.
- Hyypä, M.T. and Mäki, J. (2003) Social Participation and Health in a Community Rich in Stock of Social Capital. *Health Education Research* 18 (6): 770-779.
- Inchley J., Currie D., Young T., Samdal O., Torsheim T., Augustson L. et al. (2016) Growing up unequal: gender and socioeconomic differences in young people's well-being. Health Behaviour in School-aged Children (HBSC) study: International Report from the 2013/2014 survey. Copenhagen: WHO Regional Office for Europe.
- Kickbusch I. (2008) Health literacy: an essential skill for the twenty-first century. *Health Education*, 108(2), 101-104.
- Kickbusch I, Pelikan J, Apfel F, Tsourous A (Eds.), (2013). Health literacy: The solid facts. WHO Regional Office for Europe, Copenhagen.
- Kroll L. E., Schumann M., Hoebel J. and Lampert T. (2017) Regional health differences: developing a socioeconomic deprivation index for Germany. *Journal of Health Monitoring*, 2, 98-114.

Luopa P, Kivimäki H, Matikka A, Vilkki S, Jokela J, Laukkarinen E. and Paananen R (2014) [Wellbeing of adolescents in Finland 2000–2013. The results of the School Health Promotion study]. National Institute for Health and Welfare (THL). Report 25/2014. Helsinki, Finland.

Madarasova Geckova A., Tavel P., van Dijk J. P., Abel T. and Reijneveld S. A. (2010) Factors associated with educational aspirations among adolescents: cues to counteract socioeconomic differences? *BMC Public Health*, 10(1), 154.

Manganello J. A. (2007) Health literacy and adolescents: a framework and agenda for future research. *Health Education Research*, 23(5), 840-847.

Marmot M., Allen J., Bell R., Bloomer E. and Goldblatt P. (2012) WHO European review of social determinants of health and the health divide. *The Lancet*, 380(9846), 1011-1029.

Nissinen, K. and Vuorinen, R. (2018). [Regional differences in science performance and explanatory factors: the significance of school-based career guidance]. In: Rautapuro, J., Juuti, K. (Eds) [PISA 2015 Finland's main report]. Kasvatusalan tutkimuksia, Jyväskylä, pp. 69-96.

Nutbeam D. (2000) Health literacy as a public health goal: a challenge for contemporary health education and communication strategies into the 21st century. *Health Promotion International*, 15(3), 259-267.

Paakkari L. and Paakkari O. 2012. Health literacy as a learning outcome in schools. *Health Education*, 112(2), 133-152.

Paakkari L., Kokko S., Villberg J., Paakkari O. and Tynjälä J. (2017) Health literacy and participation in sports club activities among adolescents. *Scand J Public Health*, 45(8), 854-860.

Paakkari L. T., Torppa M. P., Paakkari O., Välimaa R. S., Ojala K. S. A. and Tynjälä J. A. (2019) Does health literacy explain the link between structural stratifiers and adolescent health? *European Journal of Public Health*. doi: 10.1093/eurpub/ckz011

Paakkari O., Torppa M., Kannas L. and Paakkari L. (2016) Subjective health literacy: Development of a brief instrument for school-aged children. *Scand J Public Health*, 44(8), 751-757.

- Paakkari O., Torppa M., Villberg J., Kannas L. and Paakkari L. (2018) Subjective health literacy among school-aged children. *Health Education*, 118(2), 182-195.
- Pelikan J., Ganahl K. and Roethlin F. (2018) Health literacy as a determinant, mediator and/or moderator of health: empirical models using the European Health Literacy Survey dataset. *Glob Health Promot*, 25(4), 57-66.
- Rowlands G, Russell S, O'Donnell A, Kaner E, Trezona A, Rademakers J et al. (2018) What is the evidence on existing policies and linked activities and their effectiveness for improving health literacy at national, regional and organizational levels in the WHO European Region? Copenhagen: WHO Regional Office for Europe (Health Evidence Network (HEN) synthesis report 57).
- Sansom-Daly U., Lin M., Robertson E. G., Wakefield C. E., McGill B. C., Girgis A. and Cohn R. J. (2016) Health Literacy in Adolescents and Young Adults: An Updated Review. *Journal of Adolescent and Young Adult Oncology*, 5(2), 106-118.
- Schnohr C. W., Gobina I., Santos T., Mazur J., Alikasifuglu M., Välimaa R. et al. (2016) Semantics bias in cross-national comparative analyses: is it good or bad to have "fair" health? *Health and Quality of Life Outcomes*, 14(1), 70.
- Sentell T., Pitt R., and Buchthal O. (2017) Health Literacy in a Social Context: Review of Quantitative Evidence. *HLRP: Health Literacy Research and Practice* 1(2):e41--e70.
- Sentell T., Zhang W., Davis J., Baker K. K. and Braun K. L. (2014) The Influence of Community and Individual Health Literacy on Self-Reported Health Status. *Journal of General Internal Medicine*, 29(2), 298-304.
- Simonsen N., Lahti A., Suominen S., Välimaa R., Tynjälä J., Roos E., and Kannas L. (2018) Empowerment-enabling home and school environments and self-rated health among Finnish adolescents. *Health Promotion International*, doi:10.1093/heapro/day104.
- Simonsen N., Roos E., Suominen S., Laakso M., Lehto E., Villberg, J., Tynjälä J. et al. (2016). *Hälsotrender bland elever i svensk- och finskspråkiga grundskolor 1994–2014 – WHO:s skolelevsstudie (HBSC-Study)* [Health trends among pupils in Swedish- and Finnish-

speaking schools 1994-2014 – HBSC-Study)]. University of Jyväskylä; Samfundet Folkhälsan. <https://jyx.jyu.fi/handle/123456789/51712> (last accessed 28 September 2020).

Simonsen N. (2013) *Health promotion in local contexts and enabling factors. A study of primary healthcare personnel, local voluntary organizations and political decision makers.* Doctoral Thesis. Publications of Public Health M 218:2013, University of Helsinki. <https://helda.helsinki.fi/handle/10138/42075> (last accessed 28 September 2020).

St Leger L. (2001) Schools, health literacy and public health: possibilities and challenges. *Health Promotion International*, 16(2), 197-205.

Stormacq C., Van den Broucke S. and Wosinski J. (2018) Does health literacy mediate the relationship between socioeconomic status and health disparities? Integrative review. *Health promotion international*, doi: 10.1093/heapro/day062.

Summanen, A.-M. (2014) [The health education learning outcomes at the end of basic education in 2013]. Koulutuksen seurantaraportit 2014: 1. Opetushallitus, Tampere

Sørensen K., Van d. B., Fullam J., Doyle G., Pelikan J., Slonska Z. And Brand H. (HLS-EU) Consortium Health Literacy Project European. (2012) Health literacy and public health: A systematic review and integration of definitions and models. *BMC Public Health*, 12(1), 80.

THL (2019) THL's Morbidity Index 2014-2016.

http://www.julkari.fi/bitstream/handle/10024/138347/Tilastoraportti_THL_sairastavuusindeksi_2014-2016.pdf?sequence=5&isAllowed=y. Last accessed June 10th 2020.

Torsheim T., Cavallo F., Levin K. A., Schnohr C., Mazur J., Niclasen B. and Currie C. (2016) Psychometric Validation of the Revised Family Affluence Scale: a Latent Variable Approach. *Child Indicators Research*, 9(3), 771-784.

Utz S. and Muscanell N. (2015) Social Media and Social Capital: Introduction to the Special Issue. *Societies*, 5(2).

Viner R. M., Ozer E. M., Denny S., Marmot M., Resnick M., Fatusi A. and Currie C. Adolescence and the social determinants of health. *The Lancet*, 379(9826), 1641-1652.

World Health Organization (WHO). (1986) Ottawa Charter for health promotion. Geneva: WHO.