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HEALTH AND FOOD LITERACY: OPPORTUNITIES FOR POLICY AND PRACTICE

Summary of the thesis

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Key words: health literacy, food literacy, nutrition, HLS-EU-Q16, public policy, public health, health programs, health interventions, public health policies

Summary

The reasoning behind the research

Health literacy is an important concept because it enables people to develop skills and confidence to make informed decisions about health, impacting themselves and their families.

People with adequate levels of health literacy take an active role related to their health, are able to navigate the health-care system and to be involved in health-related aspects from their society. Food literacy is a sub-component of the broader term of health literacy and helps people foster a healthy relationship with food by offering them knowledge and skills which ultimately lead to a better health and quality of life. Non-formal education has the potential of aiding people learn better by using methods that can be complementary to the formal education methods.

The long-term goal of this thesis was to better understand the concepts of health literacy and food literacy and to explore these concepts in the Romanian cultural context to provide possible solutions to improve these types of literacy and to explore various policy proposals, which could be adopted at national level. My thesis consists of seven chapters on public health and policy from the perspective of health and food literacy, non-formal education and explores further ideas of improving these concepts in the Romanian population.

The first two chapters offer an overview on the concepts of literacy, health literacy, food literacy, education and are meant to set the foundation for the rest of the thesis. Definitions, history, statistics, conceptual models, best practices, and state of the art research is presented for all concepts. Furthermore, the relationships between the concepts is explored more in-depth and future directions of study are presented.

The third chapter presents the methodology and objectives of the present thesis and transitions towards the empirical chapters of this thesis.

In chapter four, the concepts of health and food literacy were explored in a sample of Romanian population from the North-West Region of Romania. The chapter has as an outcome the validation of the HLS-EU-Q16 for the Romanian population and explores the predictors of health literacy.

Results of the chapter show that the scale is reliable to be used for the Romanian population and that age, gender, education, self-reported health status, and concepts of food literacy are all predictors of health literacy. The study ends by formulating recommendations and future directors for study in the field of health literacy.

Chapter five explores the programs and policies related to nutrition from the perspective of different stakeholders from Romania, using interviews as a research tool. The chapter identifies the existent policies and programs on nutrition from Romania, and identifies existent problems the national level. Responses from the stakeholder interviews help in formulation of possible areas of interventions and possible policies that can be implemented at national level.

Chapter six focuses on designing, implementing, and pilot-testing an educational model that combines formal and non-formal education for a sample of university students. In this chapter all the steps of the model are explained and an evaluation of the pilot-test is provided, using focus groups. Results of the focus groups shows that the model offered promising results and it is suitable to be used in a formal education setting, such as universities. The chapter ends with further recommendations for adapting non-formal education methods to the formal educational context.

Chapter seven compiles the findings from chapters four, five and six and offers recommendations for further advancing policy and practice in the field of health and food literacy. It also presents the main findings of the present thesis, identifying the predictors of health and food literacy, the existent actions, initiatives and problems related to food literacy in Romania, and policy and program ideas for further improvement of food literacy in the Romanian population.

A detailed description of each chapter is provided below.

Chapter 1: Literacy, health literacy and food literacy

This chapter is an introduction to the subject of my thesis and presents the concepts of literacy, health literacy and food literacy. For each concept are presented definitions, how the concept has evolved over time and statistics relevant to these concepts. The connection with the field of health

is made and the most important interventions, programs and public policies related to these concepts are presented.

The purpose of literacy is to help individuals achieve their goals, participate in society and constantly develop their knowledge to reach their potential (Montoya, 2018). According to UNESCO, literacy involves a continuum of learning representing a skill that encompasses social and cultural elements and not just the ability to read and write (Mkandawire, 2018; Street & Street, 1984). Content literacy is also defined as the level of reading and writing skills needed to read, understand, and react to appropriate instructional materials in a particular field (Readence, Bean, & Baldwin, 2004). Literacy research has investigated the effects of illiteracy on health and found that most adults with reading difficulties also had poorer health outcomes or poorer health (Holt et al., 1992; Rudd, Colton and Schacht, 2000). Literacy difficulties increase the risk of poverty or social exclusion of people, make it difficult for them to keep a job and limit their involvement and social, political, cultural opportunities (OECD, 2015).

Health literacy can be considered part of the content literacy sphere, as it focuses specifically on health. However, health literacy is seen separately from literacy, being linked to it only through certain concepts. Health literacy is closely linked to literacy and involves people's knowledge, motivation and skills to access, understand, analyze and apply information to form judgments and make decisions in everyday life regarding healthcare, disease prevention and health promotion, to maintain and improve the quality of life throughout life (Sørensen et al., 2012). At first, health literacy was considered a one-dimensional concept, focusing mainly on reading ability and functional health literacy. While further research has shown that it is a multidimensional concept, taking into account the skills needed to identify and transform information into knowledge and action. There are three different types of health literacy that show the multiple dimensions of the concept: functional, interactive, and critical health literacy (Nutbeam, 2008). Health studies have identified health literacy as a potential mediator between social determinants of health and health outcomes. Age, gender, education, income, race and ethnicity were all associated with health literacy levels and health-related outcomes. Older people, men, people with less education, people with lower socio-economic status and people from different vulnerable groups have been identified as being at risk for lower levels of health literacy, hence a poorer state of health (Kutner, Greenberg, Jin, & Paulsen, 2006; Osborn et al., 2011; Sentell and Halpin, 2006).

Nutritional literacy is conceptualized as a specific form of health literacy that reflects “the ability to access, interpret, and use nutritional information” (Blitstein and Evans, 2006; Carbone and Zoellner, 2012; Silk et al., 2008). The term is often used interchangeably with food literacy, which the most cited definition describes as “the scaffolding that empowers individuals, households, communities or nations to protect the quality of their diet through change and to strengthen food resistance over time. It is composed of a collection of interdependent knowledge, skills and behaviors needed to plan, manage, select, prepare and eat food to meet needs and determine intake” (Vidgen & Gallegos, 2014). Subsequent research has classified nutritional literacy as a subset of food literacy (Vidgen & Gallegos, 2014).

Chapter 2: Education

Chapter two presents the concept of education by reviewing the definition of education, the history of education and by presenting statistics about education. It also discusses various forms of education such as formal, informal and non-formal education.

UNESCO stated that education "will enable all people to participate effectively in a free society, to promote understanding, tolerance and friendship between all nations and all racial, ethnic or religious groups" (UNESCO, 2020b). To achieve this, the role of education is to facilitate learning using various methods, such as teaching, training, guided research, storytelling and discussion. Usually, the educational process is guided by educators, but there are also different forms of self-education, because education is a process that takes place throughout life. Towards the end of 1990, the OECD, together with other experts in the field of education, defined the types of education to which it is exposed throughout life: formal education, informal education and non-formal education (OECD, 2020). Formal education can be defined as intentional learning, which is organized, structured and guided by a curriculum. This type of learning is organized by an institution and has credit courses, learning objectives, and expected outcomes (Ainsworth, Sarah, & Eaton, 2010). Non-formal education includes various structured learning situations that do not have the level of curriculum, credit courses and certifications that are typical of the formal education system and that may or may not be intended and organized by an institution. Non-formal education usually takes place as part of other activities (Ainsworth et al., 2010). According to UNESCO, "the defining feature of non-formal education is that it is an addition, alternative and / or complement to formal education in the process of lifelong learning of individuals". (UNESCO, 2012). Informal education

is a type of unstructured learning and takes place without being guided by any goal or curriculum. This type of learning is most spontaneous, so it can happen anywhere and anytime (Ainsworth et al., 2010). The main difference between informal and non-formal education is that non-formal education usually has a learning objective and often a facilitator, while informal education takes place in an unstructured manner, without anyone facilitating it.

Chapter 3: Methodology and objectives of the thesis

This chapter presents the methodology, aim and objectives of each individual study that represents the personal contribution in this thesis.

Chapter four is represented by a quantitative approach using a cross-sectional study design that assesses the level of health literacy and literacy of people in the northwestern region of Romania using the questionnaire as a research method.

Chapter five is represented by a qualitative approach by conducting semi-structured interviews with Romanian stakeholders who are involved in nutrition.

Chapter six is a qualitative approach by conducting focus groups with students who participated in a pilot test intervention on nutrition.

Chapter 4: Health and food literacy in the North-West Region of Romania: a validation study of the HLS-EU-Q16 tool

The aim of this study was to explore the relationships between health literacy and food literacy in a sample of the Romanian population in the northwestern region of Romania.

Objective 1: Validation of the HLS-EU-Q16 health literacy instrument for 1600 inhabitants in the northwestern region of Romania for a period of 12 months.

Objective 2: Assess the association between health literacy, food literacy and socio-demographic characteristics for 1600 inhabitants in the northwestern region of Romania over a period of 12 months.

To carry out this study, a representative sample was selected, randomly stratified from the northwestern region of Romania, following the rules of probabilistic sampling of electoral lists, proportional to the size of randomly selected localities in Romanian counties Bihor, Sălaj, Bistrița-Năsăud, Maramureș and Cluj. Within the five regions, 43 cities and villages were randomly selected using random.org, the probability of selection being proportional to population size. The

sampling points were distributed in proportion to the distribution of the population - the polling stations were initially selected, then the starting streets from each polling station. The eligibility criteria for participants were: 18 years or older, residence and Romanian language, no clear signs of psychological or learning disabilities and willingness to respond to the survey. Data were collected over the weekend between March and November 2019 using mobile devices by 12 trained and paid field technicians, and the Survey Monkey platform was used to collect data and complete the survey form. The questionnaire developed for this study assessed variables related to health literacy, food literacy and socio-demographic data. The majority of the sample was women (61.2%) and most of the sample live in rural areas (52.1%). In terms of education, the most common form of education completed by our respondents was high school (44.1%), followed by university (30.1%). Only a small percentage of our sample (0.6%) had no formal education. The majority of our sample was employed (44.2%), closely followed by retirees or people living on social assistance (41.9%). The majority of our sample was married (67.1%), there were couples living with children (30.9%) and there were respondents who reported having children (79.9%). The majority of the sample considered that their health is generally good (43.3%), only 14.8% declaring that they are in poor or very poor health. Half of the sample (50.6%) reported that they were interested in nutrition topics, and a quarter of the sample (25.5%) reported that they were not really interested. Most participants found it easy to find nutrition information (41.5%), to assess whether a food is healthy (47.8%) and to assess the long-term impact of eating habits on health (50, 4%). To validate the HLS-EU-Q16 scale for the Romanian population, an exploratory factor analysis (EFA) in SPSS was performed for all 16 items. The EFA results showed a Kaiser-Meyer-Okin (KMO) value of 0.850, supporting the adequacy of the sampling for analysis. The results obtained for the health literacy scale support its factorial component and reliability, with an Alpha Cronbach of $\alpha = 0.841$. The results of the HLS-EU-Q16 scale showed that the majority of the sample, 59.2%, has a sufficient level of health literacy, while 33.2% have a problematic level of health literacy and 7.5% have an inadequate health literacy.

To evaluate the predictors of health literacy, a linear regression model was developed. Age, sex, education, and self-reported health were all associated with health literacy at a significant level of $p = 0.000$, the place of residence was the only one that showed no association with health literacy. Another linear regression model was used to assess the relationship between health literacy and food literacy. Age, gender, education, and self-reported health remained associated with health

literacy, and all other variables were statistically significant. Knowledge about the long-term impact of eating habits had the strongest relationship with health literacy, followed by knowledge about finding information on nutritional topics and interest in nutritional topics. Our study showed a similar health literacy score with large studies in France, Denmark, and Iceland, and limited health literacy was related to gender, age, education, self-reported health status, and food literacy, similar with other research in the field (Dupлага, 2020; Gustafsdottir et al., 2020; Levin-Zamir et al., 2016; Lorini et al., 2019; Tang Svendsen et al., 2020; Vandenbosch, Van den Broucke, et al., 2016).

Chapter 5: Identifying existent nutrition programs and policies using stakeholders interviews: an opportunity for change

The aim of this study was to assess knowledge of nutrition programs, actions and policies and to explore the future directions of policy and practice implications in a sample of Romanian nutrition stakeholders.

Objective 1: Conduct interviews with nutrition and food stakeholders until data saturation over a five-month period.

Objective 2: Extract relevant information related to policies and programs from stakeholder interviews to improve food literacy in Romania.

Objective 3: Formulation of at least one solution to be undertaken at national level, related to the nutritional field in Romania.

The interviews were collected between March and July 2020. Each interview lasted between 26-57 minutes and was conducted using the Zoom video conferencing platform ($n = 20$) and by telephone ($n = 2$), depending on your preferences and availability of stakeholders. All interviews were recorded and transcribed. No incentives were offered to participants in this study. A total of 22 interviews were collected from stakeholders, 15 women and 7 men. These were nutrition stakeholders in the policy-making sector, the medical sector, the education sector, the NGO sector, the public sector and the private sector. Stakeholders provided information about their experience in the field of nutrition and expressed their personal views on improving the health and nutrition literacy of the Romanian population. Three main themes emerged from stakeholder interviews with 17 sub-themes explaining (1) existing actions and initiatives to explain food literacy in Romania,

(2) identifying issues that interfere with the further development of the concept, and (3) ideas for policies and programs to further improve food literacy.

The results showed that there is an existing system through which the population has access to some nutritional information, either through cultural factors or through access to medical advice. In addition, there are some existing programs aimed at improving food literacy and there is legislation and some organizational structures in this area.

However, the study highlighted some aspects that may be missing or may not be fully functional and that hinder the food literacy process in Romania. One of the main issues discussed is the fact that the legislation is not properly implemented and implemented, creating gaps in efforts to improve health and food literacy in Romania. Some examples include legislation that has already been ratified but is not enforced, such as Law no. 256/2015 (establishing the role of the dietitian and the organization and functioning of the Romanian College of Dietitians), which was approved only in 2019 and still has no rules in force and is not implemented (Stoian, 2016). Another example would be Law no. 123/2008 which prohibits the sale of fast food and processed food in schools or in a school interval, which is not fully applied, so children having access to unhealthy food. The lack of education and knowledge related to food and nutrition was highlighted as problematic in our study, and school health education can be a solution for the young population. For adults, there have been no systematic programs or interventions at national level to increase food literacy. There are prevention services covered by Law no. 95/2006 which provides annual blood tests, but there is no other follow-up system to assess compliance with medical recommendations. These issues were reported by respondents, who considered that medical staff should benefit from continuing medical education in nutrition and should have well-established screening procedures and follow-up programs in order to provide current and reliable nutritional advice. The results are consistent with findings from other countries, which show low knowledge of nutrition among medical staff and require skills in caring for nutrition-related patients among medical practitioners (Grammatikopoulou et al., 2019). Other issues that have been identified by stakeholders as missing or problematic are related to the existing national structure in Romania, which is related to nutrition. The fact that there is no updated national guideline, no College of Dietitians and no adequate structure to incorporate them into the public health system proves that the field of nutrition is still neglected and does not function properly at national level. Actions are strongly recommended to create the necessary rules and guidelines to improve these issues, as studies have shown that it is

an effective measure (Harris, Drimie, Roopnaraine and Covic, 2017; Pelletier, Menon, Ngo, Frongillo and Frongillo, 2011). This study provided several recommendations based on existing literature. These recommendations have the potential to help policy makers and public health researchers develop appropriate legislation and programs aimed at improving the food literacy of the Romanian population and can lead to significant behavioral changes at the national level.

Chapter 6: Formal and non-formal education combined: an educational model to improve students' food literacy

The aim of this study was to provide a model that combines formal and non-formal education that can be easily adapted and applied in a university context.

The objectives are:

Objective 1: Design a combined model of formal and non-formal education to improve student food literacy over a semester.

Objective 2: Implement the model for a period of five months in a formal environment, such as a university.

Objective 3: Evaluate the results of the model using at least two focus groups with students as a qualitative approach.

The model designed for this study had two components: formal education and non-formal education. The model is built on the theory of experiential learning, which is also found under the name of "learning by doing" (Roberts, 2003). The theory was used to create a learning objective, namely to increase the food literacy of the participants by exposing them to a real life situation in which they had to create a health campaign for the population, being responsible for all phases such a task: from finding the necessary information that best suits their subject, developing materials, pre-testing, implementing and evaluating the health campaign. The formal and non-formal educational model was implemented during a semester (5 months) in a sample of students from Babeş-Bolyai University, Cluj-Napoca, Romania. The formal component was assessed using assignments during the semester, an oral exam and a presentation of the campaign results, components that were all noted.

The non-formal component was assessed using focus groups that explored whether there were changes in students' literacy as a result of the implementation of the campaign, even if they were not the target group for the information used. After presenting their campaigns and being graded,

28 student teams (16 teams of 3 students and 8 teams of 2 students) who showed a special effort and involvement in the design, implementation and evaluation of their health campaigns were asked to participate in a focus group. The final number of participants in focus groups was 64 students. The results of this study showed that after the implementation of health campaigns, students' knowledge of nutrition changed, only by exposure to information about nutrition as part of their research for campaigns. Even though students were not the main target for behavior change, as was their target group, they still reported finding new information they were unaware of, especially in terms of sugar, vegetable protein, but also general information about nutrition that they were unaware of or considered a myth. Research conducted in other countries has shown that non-formal education has proven to be very effective across a range of age groups, genders and nationalities, even since the 1970s (Underwood, 2012). Studies on different forms of non-formal education have shown that there are different settings in which people can learn about nutrition, even if the purpose of the main activity is not nutrition education. Some examples of such places are: summer camps (Rosenkranz, Rodicheva, Updike, Rosenkranz and Dzewaltowski, 2017; Ventura and Garst, 2013), hospitals, when people go for treatment or check-ups (del Río et al., 2019; Raber, Crawford, & Chandra, 2017) or using gamification techniques (DeSmet et al., 2014; Nour, Yeung, Partridge, & Allman-Farinelli, 2017; Yien, Hung, & Hwang, 2011). The results also showed that finding more nutrition information made students more responsible for what they ate, especially because they had to provide information and advice to others about the importance of nutrition on health. Previous research has shown that higher levels of health and nutrition knowledge are associated with fewer unhealthy eating behaviors (Huang, Yang and Chiang, 2020; Yang, Luo and Chiang, 2019). Other perceptual findings showed that after gaining information about nutrition through the health campaigns they implemented, students felt guilty when they ate foods they knew were unhealthy. Our results are similar to other findings in the literature that report feelings of guilt when we eat unhealthy foods, such as snacks (Hsieh, 2004).

The educational model has the potential to inform educational policies to integrate non-formal education into formal structures, such as universities and high schools. The model could contribute to improving the coherence between formal and non-formal education and may have the potential to recognize not only the potential of non-formal education but also to take important steps to stabilize and strengthen the links between institutional actors and non-formal sector stakeholders.

The use of the educational model explained in this chapter has the potential to improve students' food literacy and, consequently, their health literacy and health outcomes. In addition, by adopting this model at the national level, Romania can adhere to the European Union's recommendations for the recognition and inclusion of non-formal education in our national plan and to create education for the nutritional health of students.

Chapter 7: Conclusions

In this chapter, general conclusions were presented based on the three previous chapters. Some of these general conclusions are:

1. Education and literacy are the basis of health and food literacy, equipping people with basic reading and writing skills, knowledge, functional literacy and enhancing their individual empowerment. These abilities will help them take action on their health and eating habits.
2. Validation of the health literacy assessment instrument HLS-EU-Q16 for the northwestern region of Romania and assessment of the association between health literacy, food literacy and socio-demographic data. As far as we know, there is no other scale for evaluating validated health literacy for the Romanian population.
3. The percentage of people with low levels of health literacy in the northwestern region of Romania is 41%, and age, sex, education, self-reported health and food literacy were found as predictors of literacy in health. Moreover, our study showed predictors of health literacy, among which food literacy was one of the strongest predictors. These findings are extremely useful because they add valuable information from Romania to the international scientific database on health and food literacy.
4. The results of the stakeholder interviews revealed the existing mechanisms for improving food literacy (and therefore health literacy), nutrition policies, nutrition improvement programs and existing medical structures for nutritional problems. However, the results showed that existing legislation is not properly implemented or implemented, existing programs are not national, do not always have continuity, and do not target the whole population, and the field of healthcare needs an improvement in policies related to nutrition and nutrition literacy for health professionals and the appropriate involvement of dietitians in the health system.

5. The solutions identified by stakeholders focused on strengthening the organizational structure and infrastructure at national level for better actions and programs related to the nutrition field and the creation, implementation and implementation of policies to improve food literacy.
6. Finally, an educational model has been developed as part of this thesis, which combines formal and non-formal education and has succeeded in improving the short-term food and nutritional knowledge, attitudes and behaviors of university students. This model has the potential to help students improve their knowledge of food and nutrition by simply working on the tasks required during a particular course. The model can be easily adapted and used for further studies and interventions on university students.
7. The work undertaken as part of this thesis provides a holistic view of the areas of health literacy and food literacy and tests a viable solution to improve these concepts. These results can continue to be used to improve public health policies related to nutrition, the development of interventions and programs and the creation of actions leading to a more health-educated society. Such changes implemented at national level have the potential to improve the quality of life and general health of the Romanian population.