LEVEL OF HEALTH LITERACY AND ASSOCIATED FACTORS AMONG RURAL AND URBAN SECONDARY SCHOOL STUDENTS IN SANLIURFA PROVINCE, TURKEY

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Abstract
Low health literacy is a major source of poor health status among all age group. Aim of this study is to investigate level of health literacy and factors associated with it among children in the rural and urban secondary school in Sanliurfa province of Turkey. The cross-sectional study was carried out among children aged 12-15 years old in urban and rural areas in the Southeast Anatolia Region of Turkey. Health Literacy Survey Questionnaire (HLS-EU-Q47) was used for data collection. In this study, general internal consistency (Cronbach's alpha) of the HLS-EU-Q47; was found to be 0.916. Total 1,997 children participated from 18 schools in the study, 47.2% were females and 52.8% were males. The age of the participant's ranged from 12 to 15 years. The mean (SD) of measured weight, height, and BMI of the students were 47.2 ± 10.7 kg, 154.4 ± 7.8 cm, and 19.6 ± 3.5 kg/m², respectively. The prevalence of obesity, overweight and underweight were 6.5%, 13.8%, and 6.3% respectively. The prevalence of having daily breakfast, soft-drink, fruit, and tooth brushing frequency were 53.6%, 14.4%, 39.3%, and 38.5% respectively. Generally, the HL level was very low among the children in this study.

Keywords: Health literacy, school children, rural health, urban health, parent education.

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Introduction

Low health literacy is a major source of poor health status among all age groups. Health literacy (HL) has been addressed as one major public health issue silently affecting all population. Studies showed that around 80 million American adults are affected by low HL (1). Literacy provides the skills that enable individuals to understand and communicate health information and concerns. Literacy is defined as a set of reading, writing, basic mathematics, speech, and speech comprehension skills (2). HL defined as “the capacity to which individuals can obtain, process, and understand basic health information needed to make appropriate health decisions” (3). The individuals with adequate health literacy can make right decisions to improve their health and well-being (4). Health literacy is the bridge between the literacy (and other) skills and abilities of the individual and the health context.

The HL is of concern to everyone involved in health promotion and protection, disease prevention and early screening, health care and maintenance, and policy making. Health literacy skills are needed for dialogue and discussion, reading health information, interpreting charts, making decisions about participating in research studies, using medical tools for personal or familial health care (5). From a public health perspective, children and young people constitute a core target group for health literacy research and intervention as during childhood and youth, fundamental cognitive, physical and emotional development processes take place (6) and health-related behaviors and skills develop. As a result, these stages of life are regarded as crucial for healthy development, as well as for personal health and well-being throughout adulthood (7,8). Moreover, health literacy is understood as a variable construct that is acquired in a life-long learning process, starting in early childhood (9). Hence, targeting children and young people with health literacy interventions can help promoting healthy behaviors and reduce future health risks.

Priority of public health for preventing childhood obesity and increasing HL, few intervention studies have evaluated the influence of HL on weight-related child outcomes. The prevalence of childhood obesity has increased significantly over the previous four decades, stabilizing over the past decade, with approximately one-third of US children being classified as obese (10). The understandability of health information is of public concern. High percentages of adults have limited ability to use print materials to accomplish their tasks, and many health education materials are written at a level higher than these adults can comprehend based on literacy in this filed. When considering children, parents and caregivers play an important role in providing healthy eating and physical activity opportunities.

Researchers from different countries have investigated the relationship between health literacy and adult populations health status; however, very few studies have been carried out directly with children and adolescent population, leading to a significant gap in literature (11,12). The situation is the same in Turkey, researchers have focused on adult population; however, studies with children cannot be found. The aim of the study to investigate level of health literacy and factors associated with it among children in the secondary school in East of Turkey.
Materials and Method

Research design and location
This cross-sectional study was conducted among secondary school students getting education in the urban and rural areas of Şanlıurfa between January 2017 and June 2017. The study was conducted on a sample of secondary school students from rural and urban areas in Şanlıurfa Province located in the Southeast Anatolia Region. Şanlıurfa is among the less developed provinces compared to west part of country, especially its rural areas are underdeveloped. Based on the register as of 2017 TürkStat, the population of Şanlıurfa totals 1,985,753 people (13). There are 204,084 students (56.7% are male and 34.2% are in rural areas) at the Şanlıurfa’s secondary schools.

Study group
The minimum sample size was 2,750 with a margin of error of 1%, and considering the frequency of obesity as 8%. Seven counties (Haliliye, Eyyubiye, Karaköprü, Birecik, Hilvan, Suruc, Siverek) where dietitian service is provided were included in the study. The number of students to choose from each districts was chosen in proportion to the population’s distribution. Total 18 schools were randomly selected from seven counties. There were 2933 students in 18 schools.

Study procedure
The questionnaires used in the study were filled in by the students under supervision in about 30 min. The specially designed questionnaire form included questions about socio-demographic characteristics (age, gender, parents’ education level and working status, family income status, a family history of chronic disease, student’s history of any disease), eating behavior (breakfast consumption, fruit consumption, soft-drink consumption), physical activity and sedentary behavior (moderate-to-vigorous physical activity, time spent with screens such as television, smartphones, tablet PCs and computers), tooth brushing frequency and self-rated health.

We used European Health Literacy Survey Questionnaire (HLS-EU-Q47) to assess health literacy. HLS-EU-Q47 is a self-report scale developed to evaluate the health literacy of at least primary school graduated (14) HLS-EU-Q47 contained 47 items measuring health literacy. The lowest score is 47 and the highest is 188. Total scores were standardized to be between 0 and 50. The resulting four levels were ‘inadequate’ (0–25), ‘problematic’ (25–33), ‘sufficient’ (33–42) and ‘excellent’ (42–50) health literacy. To detect vulnerable groups, the ‘inadequate’ and ‘problematic’ levels were combined to a single level, called ‘limited health literacy’ (0–33). In this study general internal consistency (Cronbach’s alpha) of the HLS-EU-Q47; was found to be 0.916.

After the completion of the questionnaire, body height and weight of each student were measured and recorded. Obesity was assessed by using WHO criteria (< 85th percentile, normal; 85 – 95th percentile, overweight; and ≥ 95th percentile, obese) (15). The detailed protocol for the study and the questionnaire were obtained from the previous Health Behavior in School-aged Children (HBSC) study (16).

Statistical analysis
Data were analyzed using the Statistical Package for the Social Sciences 20.0. We used descriptive statistics (frequencies, proportions, means, and medians) to assess the demographic characteristics and the health literacy. Data were analyzed by using chi-square test as a univariate analysis and multiple logistic regression as a multivariate analysis. The multivariate logistic regression model included independent variables that were found to be significant (for variables at p < 0.10 significance level in univariate analysis). Odds ratios and 95%
Confidence intervals were calculated for the variables associated with health literacy.

**Ethical clearance**
The required permissions for conducting the study were obtained from school administration, Harran University Ethics Committee (approval number 12/08.12.2016) and informed verbal consent was obtained from each student and their parents.

**Results**

Of the 1,997 (%68.2) students included in the study, 47.2% were females and 52.8% were males. The age of the students ranged from 12 to 15 years, with a mean age of 12.97 ± 0.57 years. The mean (SD) of weight, height, and BMI of the students were 47.2 ± 10.7 kg, 154.4 ± 7.8 cm, and 19.6 ± 3.5 kg/m², respectively. Of the students comprising the study group, 16.7% were considered adequate health literacy (38.46 ± 4.47) and 83.2% limited health literacy (18.54 ± 10.55).

| Characteristics                | Adequate health literacy n % | Limited health literacy n % | Test Statistics X²; p       |
|--------------------------------|-----------------------------|-----------------------------|-----------------------------|
| Gender                         |                             |                             |                             |
| Male                           | 165                         | 15.6                        | 890                        | 84.4                        | 2.065; 0.151               |
| Female                         | 170                         | 18.0                        | 772                        | 82.0                        |                             |
| Residence                      |                             |                             |                             |                             |                             |
| Urban                          | 231                         | 18.0                        | 1049                       | 82.0                        | 4,130; 0.042               |
| Rural                          | 104                         | 14.5                        | 613                        | 85.5                        |                             |
| Educational level of mother    |                             |                             |                             |                             |                             |
| Illiterate                     | 119                         | 12.9                        | 802                        | 87.1                        | 32,637; <0.001             |
| Primary school                 | 175                         | 19.7                        | 715                        | 80.3                        |                             |
| High school                    | 23                          | 20.7                        | 88                         | 79.3                        |                             |
| University                     | 14                          | 42.4                        | 19                         | 57.6                        |                             |
| Employment status of mother    |                             |                             |                             |                             |                             |
| Unemployed                     | 294                         | 16.7                        | 1462                       | 83.3                        | 0.011; 0.916               |
| Employed                       | 41                           | 17.0                        | 200                        | 83.0                        |                             |
| Educational level of father    |                             |                             |                             |                             |                             |
| Illiterate                     | 21                          | 8.6                         | 222                        | 91.4                        | 19,536; <0.001             |
| Primary school                 | 201                         | 16.7                        | 1000                       | 83.3                        |                             |
| High school                    | 72                           | 20.4                        | 281                        | 79.6                        |                             |
| University                     | 33                           | 23.7                        | 106                        | 76.3                        |                             |
| Employment status of father    |                             |                             |                             |                             |                             |
| Unemployed                     | 42                           | 11.9                        | 312                        | 88.1                        | 7,432; 0.006               |
| Employed                       | 293                          | 17.8                        | 1350                       | 82.2                        |                             |
| Family income (monthly)        |                             |                             |                             |                             |                             |
| <500 TL                        | 61                           | 9.9                         | 558                        | 90.1                        | 42,333; <0.001             |
| 500-1500 TL                    | 147                          | 17.5                        | 692                        | 82.5                        |                             |
| >1500 TL                       | 116                          | 24.6                        | 355                        | 75.4                        |                             |
| A family history of chronic disease | 177                          | 16.2                        | 915                        | 83.8                        | 0.554; 0.457               |
| Yes                            | 158                          | 17.5                        | 747                        | 82.5                        |                             |
| Student’s history of any disease | 284                          | 16.9                        | 1395                       | 83.1                        | 0.147; 0.701               |
| No                             | 51                           | 16.0                        | 267                        | 84.0                        |                             |

The prevalence of obesity, overweight and underweight were 6.5%, 13.8%, and 6.3% respectively. The prevalence of having daily breakfast, soft-drink, fruit, and tooth brushing frequency were 53.6%, 14.4%, 39.3%, and 38.5% respectively. Distribution of students' health literacy according to BMI, eating behavior, physical activity and sedentary behavior are given in table 2.
Table 2: Sample characteristics of the study group.

| Variables | Adequate health literacy n % | Limited health literacy n % | Test Statistics X²;p |
|-----------|-------------------------------|-----------------------------|----------------------|
| **Body mass index** |                               |                             |                      |
| Underweight | 12 (9.5)                      | 114 (90.5)                  | 21,715; <0,001       |
| Normal      | 228 (15.6)                    | 1238 (84.4)                 |                      |
| Overweight  | 70 (25.5)                     | 205 (74.5)                  |                      |
| Obese       | 25 (19.2)                     | 105 (80.8)                  |                      |
| **Daily breakfast consumption** |                               |                             |                      |
| Yes         | 134 (16.7)                    | 793 (83.3)                  | 6,670; <0,001        |
| No          | 201 (17.0)                    | 869 (83.0)                  |                      |
| **Daily soft-drink consumption** |                               |                             |                      |
| Yes         | 293 (11.9)                    | 1416 (88.1)                 | 1,158; 0.282        |
| No          | 42 (17.8)                     | 246 (82.2)                  |                      |
| **Daily fruit consumption** |                               |                             |                      |
| Yes         | 177 (14.5)                    | 1036 (85.5)                 | 10,549; <0,001       |
| No          | 158 (18.8)                    | 626 (81.2)                  |                      |
| **Daily tooth brushing frequency** |                               |                             |                      |
| Yes         | 167 (17.1)                    | 1062 (82.9)                 | 23,248; <0,001       |
| No          | 168 (14.6)                    | 600 (85.4)                  |                      |
| **Self-rated health** |                               |                             |                      |
| Excellent and good | 285 (14.6)                    | 1234 (85.4)                 | 17,950; <0,001       |
| Fair and poor | 50 (20.2)                      | 428 (79.8)                  |                      |
| **Daily time spent with screens** |                               |                             |                      |
| <4 hr       | 107 (13.6)                    | 584 (86.4)                  | 1,260; 0.262        |
| ≥4 hr       | 228 (21.9)                    | 1078 (78.1)                 |                      |
| **Moderate-to-vigorous physical activity** |                               |                             |                      |
| No          | 175 (18.8)                    | 1003 (81.2)                 | 7,580; 0.006        |
| Yes         | 160 (10.5)                    | 659 (89.5)                  |                      |

The estimated crude ORs for area, educational level of mother, educational level of father employment status of father, family income, body mass index, daily breakfast consumption, daily fruit consumption, daily tooth brushing frequency, self-rated health, and moderate-to-vigorous physical activity were statistically significant. After multivariate logistic regression analysis, educational level of mother, family income, body mass index, daily tooth brushing consumption, self-rated health remained significant in the model (Table 3).

Table 3: The variables associated with health literacy were determined by a multivariate logistic regression analysis.

| Variables | Crude OR (95% CI) | Adjusted OR (95% CI) |
|-----------|-------------------|----------------------|
| **Settlements** |                   |                      |
| Urban     | 1                 | 1                    |
| Rural     | 1,298 (1.01-1.67) | 1,17 (0.89-1.54)     |
| **Educational level of mother** |                   |                      |
| Illiterate | 4,97 (2.43-10.17) | 3,01 (1.28-7.06)    |
| Primary school | 3,011 (1.48-6.12) | 2,64 (1.15-6.05) |
| High school | 2,819 (1.23-6.46) | 2,54 (1.04-6.23) |
| University | 1                 | 1                    |
| **Educational level of father** |                   |                      |
| Illiterate | 3,29 (1.82-5.96) | 1,10 (0.54-2.23)     |
| Primary school | 1,55 (1.02-2.36) | 0,78 (0.46-1.32)    |
| High school | 1,22 (0.76-1.94) | 0,82 (0.48-1.35)    |
| University | 1                 | 1                    |
| **Employment status of father** |                   |                      |
| Unemployed | 1,61 (1.14-2.27) | 0,92 (0.62-1.37) |
| Employed  | 1                 | 1                    |
| Family income (monthly) | <500 TL | 2.99 (2.13-4.19)** | 2.41 (1.60-3.61)** |
|------------------------|---------|-------------------|-------------------|
|                        | 500-1500 TL | 1.54 (1.17-2.03)** | 1.32 (0.97-1.79) |
|                        | >1500 TL | 1.01 (0.61-1.61) | 1.01 (0.61-1.61) |
| Body mass index        |         |                   |                   |
|                       | Underweight | 1.01 (0.61-1.61) | 1.01 (0.61-1.61) |
|                       | Normal | 1.75 (0.95-3.22) | 1.27 (0.68-2.39) |
|                       | Overweight | 0.54 (0.39-0.73)** | 0.55 (0.39-0.76)** |
|                       | Obese | 0.77 (0.49-1.22) | 0.86 (0.52-1.40) |
| Daily breakfast consumption | Yes | 1.37 (1.08-1.74)** | 1.25 (0.96-1.61) |
|                       | No | 1.01 (0.61-1.61) | 1.01 (0.61-1.61) |
| Daily fruit consumption | Yes | 1.48 (1.18-1.87)** | 1.25 (0.96-1.61) |
|                       | No | 1.01 (0.61-1.61) | 1.01 (0.61-1.61) |
| Daily tooth brushing frequency | Yes | 1.78 (1.41-2.26)** | 1.54 (1.20-1.99)** |
|                       | No | 1.01 (0.61-1.61) | 1.01 (0.61-1.61) |
| Self-rated health      | Excellent and good | 1.01 (0.61-1.61) | 1.01 (0.61-1.61) |
|                       | Fair and poor | 1.98 (1.44-2.72)** | 1.54 (1.20-2.17)** |
| Moderate-to-vigorous physical activity | No | 1.39 (1.10-1.76)** | 1.24 (0.96-1.60) |
|                       | Yes | 1.01 (0.61-1.61) | 1.01 (0.61-1.61) |

* p < 0.05, ** p < 0.01, *** p < 0.001.

**Discussion**

The study demonstrated that general HL level of the children was low. The various factors influenced their HL level. The findings show that HL level was different by residences of the participants, educational level of parents, employment status of father, family income, participants body mass index, daily breakfast consumption, daily fruit consumption, daily tooth brushing frequency, self-rated health, and moderate-to-vigorous physical activity. Pervious scientific literacy shows the association between health literacy and socio-demographic factors, including family income, education background and age (17-21). A USA study demonstrated people living in rural areas are more likely than those in mixed urban-rural areas to have low levels of health literacy. Lower health literacy may result in poor health outcomes among rural cancer patients and contribute to disparities in cancer care (22). The rural area residents suffered more from low functional health literacy, compared with their urban counterparts (23). HL levels were significantly associated with annual household income, father's education level, and mother's education level. Those whose annual household income was high had higher HL levels than those whose annual household income was low. The relationship between HL levels and parents’ education level was significant in this study; specifically, the HL level of participants whose parents had a postgraduate education was the lowest. Interestingly, the HL levels of students whose parents were teachers were the highest for both mother and father’s occupation (24), according to these results, we can see that higher education level of parents did not really affect children’s HL but the occupation really influence HL level of children's. A study from Finland shows that perceived health literacy was higher among adolescents who participated in sports club activities (25). Generally, people who care more about their health are more active on doing sport and they read information related to health. The current study also examined the relationship between BMI and HL level, the result determined that over or under weight participants have low HL. Child health literacy was negatively correlated with BMI Z-scores in overweight children in New York City (26). Finds of the study and other previous studies from different regions shows that various factors affect...
HL level among children. People with good HL are more likely to adopt healthier behaviors. Good HL enables individuals to protect themselves, their family and community members from various risks.

This study shows the influence of health literacy in obtaining habits such as daily breakfast consumption, daily fruit consumption, daily tooth brushing frequency and moderate-to-vigorous physical activity in children. By increasing the level of health literacy in children, it is possible to develop the right nutrition behaviors, good oral health and physically active lifestyles. Additionally, interventions that will increase the level of health literacy may have a positive impact on obesity prevalence in the longer term. Health literacy should be used as an important tool in reducing inequalities.

There are some strengths of this study, the study was conducted multiple study centers and study schools were selected from urban and rural areas. The data related to health literacy was collected using self-reported method so information bias may occur.

Conclusions

The findings of the study show that HL level was different between rural and urban residences, educational level of parents, employment status of father, family income, body mass index, daily breakfast consumption, daily fruit consumption, daily tooth brushing frequency, self-rated health, and moderate-to-vigorous physical activity. Based on the findings of the study we suggest that the school students must be educated and improve their health literacy. The health literacy education policy must be developed and implement in the region.

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