

# An evaluation of the environmental literacy levels of nursing students in Türkiye

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## Abstract

The study was aimed to investigate the environmental literacy levels of the nursing students, including the dimensions of environmental knowledge, attitudes, behaviour, and perceptions. It was a descriptive and cross-sectional study, including 292 nursing students who had accepted participation in the study. Data were collected in the fall term of the 2019-2020 academic year using the Sociodemographic Characteristics Form and the Environmental Literacy Scale. According to the results, nursing students' sub-dimension scores were 12.23±2.96 for environmental knowledge, 66.11±12.25 for environmental attitude, 41.22±6.38 for environmental behaviour, and 10.26±2.08 for environmental perception. The environmental literacy levels of nursing students are at a moderate level. The study found a statistically significant difference between class level, age, gender, father educational status, talking about environmental issues in the family, environmental education status, being involved in the environmental project, source of environmental information, membership of the environmental organizations, and the mean score of the scale ( $p < 0.05$ ). As a result, it is suggested to plan interventional studies with larger samples to improve the environmental literacy levels of nursing students and to make necessary regulations in the course contents.

**Keywords:** Nursing students, environmental literacy, environmental knowledge, environmental attitude, environmental behaviour, environmental perception

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## Introduction

The environment plays an essential role in supporting life on earth. However, there are some problems that harm living conditions and the world ecosystem. These problems do not only interest the environment, but all living things on earth. The primary sources of these problems are pollution, global warming, greenhouse gas, and other environmental problems. People daily activities persistently reduce the quality of the environment and consequently, it causes survival conditions to disappear day by day [1]. The term environmental education has emerged as a response to increasing environmental problems such as global warming, climate change, destruction of rain forests, threats to biodiversity, increasing rates of land degradation and desertification, population-resource imbalances, nuclear accidents, destruction of toxic waste, ozone depletion, pollutions, affecting the quality of life and the sustainability of the ecosystem [2]. Ramsey et al. (1992) stated that environmental education should help individuals gain the necessary skills to be sensitive to a rapidly changing technological world, understand the problems of the contemporary world, and play an active role in the improvement and sustainability of the environment [3]. Environmental education aims to gather information, develop knowledge, take into account different views and make judgments, understand the mutual relationship in nature, evaluate information, solve problems, adopt a relevant attitude towards the environment, develop responsible behaviour pattern, take positive actions and increase the willingness to participate in decision-making processes [4]. Environmental education aims to make people behave responsibly towards the environment.

The environmental education objectives mentioned above can help increase awareness, knowledge, sensitivity, values, attitudes, behaviour patterns, skills and motivation to identify and solve environmental problems. These are crucial for environmental education. Hence, environmental education trains people who can analyse environmental problems, adopt a critical attitude toward the person's environment, and cause changes in their

actions and behaviours. For the effective implementation of environmental education at all educational levels, environmental education objectives need to be transformed into goals [5]. The concept of environmental literacy emerged after the concepts of environmental ignorance. The concept is called the skills that encourage understanding the environmental, social, and economic dimensions of human-environment interactions and developing sustainably various human societies and the ecological systems in which they are placed [6]. Roth (1992) defines environmental literacy as the ability to perceive and interpret the health of environmental systems and take appropriate measures to protect or improve the health of these systems. Environmental education is of great importance in raising environmentally literate individuals. This process, which starts in childhood especially in the family and continues throughout life, should be taken seriously and followed. For this reason, it is significant for a sustainable future to know the level of environmental literacy of young people studying in higher education institutions before graduation and to improve their deficiencies. Several papers in the literature investigate the environmental literacy levels of students and the factors affecting them. Studies have found that out-of-school factors and demographic characteristics can also affect students' level of environmental knowledge and their attitude towards the environment [7-15]. Accordingly, it is remarkable to know the factors affecting these levels in determining the environmental literacy levels of students.

Since Florence Nightingale, the relationship between environment and health has been emphasized as one of the basic concepts of nursing science. She emphasized that an unfavourable environment consists of a combination of factors and conditions that cause disease and death or harm the development and survival of an organism [16]. Environmental awareness for nurses begins with the promotion of sustainable practices. Especially during higher education, which has an essential place in preparing nursing students for life and professional life, it is important to raise conscious students who are sensitive to the environment and contribute to protecting natural resources. Since nurses

are the largest group in the healthcare industry, they play an important role in both individual and social areas for environmental awareness, protection, and long-term development of the healthcare sector [17,18,19]. For this reason, it is essential to encourage environmentally sensitive attitudes and behaviours of healthcare professionals, including nursing students. In this context, it is important to conduct more research on the attitudes and behaviours of nursing students towards the environment.

This study aimed to investigate the environmental literacy levels of nursing students from the point of various variables. The study is essential to determine the deficiencies by identifying the current environmental literacy levels of the nursing students and to plan the necessary interventions to eliminate these deficiencies.

## Materials and Methods

### *Study design*

This study was conducted at the Sinop University Faculty of Health Sciences Nursing Department. Data were collected in the fall term of the 2019-2020 academic year. The universe of the study was 400. Since it was aimed to reach the whole universe, no sample selection was made. During the data collection process, all students in the classroom who agreed to participate in the research were included in the study. The study was completed with 292 students. The participation rate was 73%. Inclusion criteria were: studying at the nursing department and agreeing to take part in the study. The data were collected by the master's student, by face-to-face interview method during or after classes. It took about five minutes to fill out the data collection forms.

### *Instruments*

Socio-demographic Characteristics Form and the Environmental Literacy Scale was used for data collection.

### *Socio-demographic characteristics form*

This form consisted of 15 items and two parts. In the first part; year of study, gender, age, the high school which they graduated from, place of residence for a long time, family income level, educational level of mother, educational level of

father, working status of mother and working status of father were included. In the second part, there are questions about the environment such as getting education about the environment, the sources from which information about the environment was obtained, the membership status of the environmental non-governmental organization, having a project related to the environment in or out of school and talking about environmental issues within the family.

### *Environmental literacy scale*

The scale was developed by Kışoğlu (2009) comprises four sub-dimensions: environmental information, environmental attitude, environmental behaviour and environmental perception. *Environmental knowledge*: This sub-dimension, which is created to measure the level of knowledge about the environment, consists of 20 multiple-choice questions. Multiple choice questions have four choices and each correct question is worth one point. In this section, points are calculated by considering the correct answers, and a total score is obtained by giving one point for each correct answer and zero for incorrect answers. The reliability coefficient (alpha) of the environmental information sub-dimension is 0.64. *Environmental attitude*: This sub-dimension, in which environmental attitudes are evaluated, consists of 18 multiple-choice questions. This sub-dimension of the environmental literacy scale is in the 5-point Likert scale. Items are scored over five points (Strongly agree = 5, Agree = 4, Undecided = 3, Disagree = 2, Strongly disagree = 1). Negative items are scored in reverse. A minimum of 18 and a maximum of 90 points can be obtained for this sub-dimension. The reliability coefficient (alpha) of the environmental attitude sub-dimension is 0.77. *Environmental behaviour*: This sub-dimension consists of 20 behaviour sentences on a 3-points Likert scale to determine the frequency of students' environmentally sensitive behaviour. Scaled scoring is done as always = 3 points, occasionally = 2 points, never = 1 point. Accordingly, a minimum of 20 and a maximum of 60 points can be obtained from the sub-dimension. The reliability coefficient (alpha) of the behaviour sub-dimension is 0.79.

*Environmental perception:* In this sub-dimension there are three multiple-choice questions. Students are asked to give scores from one to five for their interest in the environment and environmental problems. Each sentence is evaluated on 5 points (1 to 5). Accordingly, a minimum of three and a maximum of 15 points can be obtained from the scale. The reliability coefficient (alpha) of perception sub-dimension is 0.78. As the scale scores increase, the environmental literacy level also increases [20].

### ***Ethical considerations***

Before starting the data collection process, written permission was obtained from the author who developed the Environmental Literacy Scale. Ethics committee approval was received from the Human Research Ethics Committee of Sinop University where the authors were affiliated (Date: 18.10.2019, Meeting No: 04, Decree No: 2019/40), and institutional permission was obtained from the Faculty of Health Sciences. In addition, written approval was received from the students who wanted to participate in the study. Participants were determined based on volunteering, and required time was given to the participants to answer the questions in a comfortably. The study was conducted by the principles of the Declaration of Helsinki.

### ***Data analysis***

Statistical analysis of the data was performed using Statistical Package for the Social Sciences (SPSS Inc, Chicago, IL) 22.0 package program. Kolmogorov-Smirnov test was applied to determine whether the data were normally distributed. The student t test, Mann Whitney U, ANOVA and Kruskal Wallis H tests were used for data analysis. Frequency, mean and standard deviation were used as descriptive statistics.

## **Results**

### ***Sample characteristics***

The study consisted of 292 people and 69.9% were female, 28.4% were at first year of study, 57.9% were between the ages of 20-22, 51.7% were Anatolian High School graduates, 46.2% were residing in the city, 79.5% had middle income, 59.2% of mothers and 46.2% of fathers had primary school graduates, 82.2% of mothers

were not working, 72.6% of fathers were working. The results indicate that 65.4% of the participants had not received any environmental training before. The internet was the first source that 77.7% of them applied to get information about the environment, and 81.2% of them were not involved in an environmental project. It is found that 60.3% of the students sometimes talk about environmental issues in the family, while 16.8% have not talked about environmental issues in the family (Table 1).

The mean scores of the students from the environmental literacy scale were found to be  $12.23 \pm 2.96$  in the knowledge,  $66.11 \pm 12.25$  in the attitude,  $41.22 \pm 6.38$  in the behaviour, and  $10.26 \pm 2.08$  in the perception sub-dimension, respectively (Table 2).

### ***Environmental literacy levels by socio-demographic features***

The analysis results for the knowledge sub-dimension of the Environmental Literacy Scale are presented in Table 1. A statistically significant difference was found for the environmental knowledge sub-dimension in terms of year of study and father's education level ( $p < 0.05$ ). Based on the pairwise comparison results, it was understood that the knowledge level of 1<sup>st</sup> grade students was lower than in other grades ( $p < 0.05$ ). On the other hand, it was determined that the mean scores of students whose fathers are university graduates are significantly higher mean scores ( $p < 0.05$ ).

The results shown that there was a statistically significant difference between the mean scores of the environmental attitude sub-dimension regarding gender, age group and talking about environmental issues in the family. Additionally, it was seen that female students' mean scores were higher than male students. According to the paired comparison results, it was found that the attitude levels of students aged 19 and under were lower than those of 20-22 years old ( $p < 0.05$ ). Finally, it was concluded that students' attitude levels about environmental issues in the family are significantly higher than other students ( $p < 0.05$ ) (Table 1).

**Table 1.** Distribution of students' socio-demographic characteristics according to environmental literacy scale sub-dimension scores (N = 292).

Features	n	Environmental knowledge	Environmental attitude	Environmental behaviour	Environmental perception
		Mean±SD	Mean±SD	Mean±SD	Mean±SD
<b>Grade</b>					
1st grade <sup>a*</sup>	83	11.29 ± 2.72	62.49 ± 15.53	39.30 ± 6.65	10.18 ± 2.46
2nd grade <sup>b*</sup>	73	13.16 ± 2.69	68.88 ± 7.24	42.82 ± 7.19	10.49 ± 2.03
3rd grade <sup>b*</sup>	69	12.22 ± 3.18	68.04 ± 8.68	41.25 ± 4.44	10.23 ± 1.51
4th grade <sup>b*</sup>	67	12.39 ± 2.99	65.58 ± 14.08	41.81 ± 6.31	10.13 ± 2.13
		$\chi^2=15.958$ p=0.001**	$\chi^2=4.950$ p=0.175	F=3.661 p=0.014**	$\chi^2=2.180$ p=0.536
<b>Father educational status</b>					
Not literate <sup>ab*</sup>	5	11.80 ± 1.92	71.80 ± 8.49	48.40 ± 5.59	11.80 ± 1.92
Literate <sup>a*</sup>	27	12.74 ± 2.99	67.59 ± 11.84	41.59 ± 5.91	10.15 ± 1.99
Primary education <sup>a*</sup>	135	12.28 ± 2.77	64.77 ± 13.43	40.84 ± 6.70	10.24 ± 2.06
High school <sup>b*</sup>	79	11.48 ± 3.15	66.42 ± 10.92	40.99 ± 5.46	10.25 ± 2.12
University <sup>a*</sup>	46	13.11 ± 3.02	68.02 ± 11.19	41.72 ± 6.91	10.22 ± 2.14
		$\chi^2=11.477$ p=0.022**	$\chi^2=4.290$ p=0.368	F= 2.133 p=0.104	$\chi^2=3.482$ p=0.481
<b>Gender</b>					
Female	204	12.24 ± 2.79	67.02 ± 11.87	41.33 ± 6.04	10.34 ± 2.03
Male	88	12.20 ± 3.32	64.00 ± 12.91	40.95 ± 7.12	10.07 ± 2.18
		U=8436.00 p=0.412	U=7517.50 p=0.028**	T=0.459 p=0.647	U=8132.50 p=0.195
<b>Age</b>					
19 years and under <sup>a*</sup>	85	11.72 ± 2.63	63.38 ± 13.58	39.59 ± 6.43	10.24 ± 2.36
Between 20 and 22 <sup>b*</sup>	169	12.46 ± 3.04	67.60 ± 11.30	41.89 ± 6.07	10.30 ± 1.92
23 years and older <sup>ab*</sup>	38	12.34 ± 3.19	65.58 ± 12.44	41.84 ± 7.06	10.16 ± 2.13
		$\chi^2=5.553$ p=0.062	$\chi^2=7.039$ p=0.030**	F=3.982 p=0.020**	$\chi^2=0.808$ p=0.668
<b>Talking about environmental issues in the family</b>					
Yes <sup>a*</sup>	67	12.70 ± 2.60	69.61 ± 11.73	42.25 ± 6.41	10.72 ± 1.76
Sometimes <sup>b*</sup>	176	12.36 ± 2.84	66.01 ± 11.77	41.43 ± 5.99	10.15 ± 2.07
No <sup>c*</sup>	49	11.12 ± 3.56	61.67 ± 13.35	39.04 ± 7.26	10.04 ± 2.43
		$\chi^2=5.038$ p=0.081	$\chi^2=17.443$ p=0.000**	F=3.906 p=0.021**	$\chi^2=5.682$ p=0.058
<b>Environmental education status</b>					
Yes	101	12.09 ± 3.21	67.06 ± 11.99	43.29 ± 6.43	10.52 ± 1.96
No	191	12.30 ± 2.82	65.61 ± 12.39	40.12 ± 6.09	10.12 ± 2.13
		U=9268.00 p=0.580	U=8858.50 p=0.251	U=6730.50 p=0.000**	U=8572.00 p=0.111
<b>Being involved in the environmental project</b>					
Yes	55	11.89 ± 3.21	67.95 ± 9.35	43.00 ± 7.35	10.73 ± 2.12
No	237	12.31 ± 2.90	65.68 ± 12.81	40.80 ± 6.07	10.15 ± 2.06
		U=5970.50 p=0.329	U=6164.50 p= 0.531	t=2.319 p=0.021**	U=5518.50 p=0.071
<b>Source of environmental information</b>					
Course book <sup>a*</sup>	16	11.13 ± 3.79	59.50 ± 15.57	40.63 ± 5.62	9.00 ± 2.03
Instructor <sup>b*</sup>	12	10.67 ± 4.37	61.58 ± 13.42	46.33 ± 7.19	11.17 ± 2.51
Internet <sup>b</sup>	227	12.34 ± 2.91	66.86 ± 11.51	40.93 ± 6.13	10.28 ± 1.98
Newspaper-Magazine <sup>b</sup>	13	13.00 ± 1.73	69.62 ± 9.43	42.08 ± 5.39	10.54 ± 2.06
TV Radio <sup>b</sup>	24	12.25 ± 2.27	63.79 ± 15.75	41.29 ± 8.31	10.33 ± 2.58
		$\chi^2=2.772$ p= 0.597	$\chi^2=9.313$ p= 0.054	F=2.173 p=0.072	$\chi^2=10.806$ p=0.029**
<b>Membership status to environmental organization</b>					
Member	16	12.00 ± 4.08	68.69 ± 11.32	43.81 ± 5.36	11.13 ± 2.21
Not a member	276	12.24 ± 2.89	65.96 ± 12.31	41.07 ± 6.41	10.21 ± 2.06
		U=2161.50 p=0.887	U=1904.00 p=0.354	U=1638.00 p=0.082	U=1565.00 p=0.046**

\*Groups that are not represented with the same letter are different from each other.\*\* p &lt; 0.05.



According to the results, it was found that the mean scores of the environmental behaviour sub-dimension were significantly different depending on the class, age, environmental education status, being involved in the environmental project and talking about environmental issues in the family. Based on the pairwise comparison results, environmental behaviour levels of 1st grade students are lower than 2<sup>nd</sup> grade students, and this difference was statistically significant ( $p < 0.05$ ). However, it was determined that the environmental behaviour levels of students aged 19 and under were significantly lower than the environmental behaviour levels of students aged 20-22 ( $p < 0.05$ ). No significant difference was found in the other pairwise comparisons (Table 1).

Moreover, it was specified that students who received environmental education had higher scores than those who did not. Those who worked on an environmental project than those who did not work, and these differences were statistically significant ( $p < 0.05$ ). Lastly, the pairwise comparison results presented that the students who talked about environmental issues in the family had a significantly higher environmental behaviour level than the students who did not talk at all ( $p < 0.05$ ).

The results revealed a statistically significant difference between the mean scores of the environmental perception in terms of the source of environmental information and the status of being a member of an environmental organization ( $p < 0.05$ ). Based on the results of paired comparison, the environmental perception levels of the students who obtained information from the course-book were lower than the environmental perception levels of the students who obtained information from the instructors, internet, newspaper-magazine, and TV-radio sources, and this difference was

statistically significant ( $p < 0.05$ ). Finally, it was concluded that the environmental perception levels of the students who are members of an environmental non-governmental organization are statistically significantly higher than the students who are not members ( $p < 0.05$ ) (Table 1).

## Discussion

This study aimed to investigate the environmental literacy levels of nursing students in terms of several variables. According to the results, it was concluded that the environmental literacy levels of nursing students were moderate and some of their socio-demographic characteristics effected their environmental literacy levels.

In the light of the analysis, it was determined that the mean scale scores of the students were significantly different in terms of gender, grade level, age, father's education level and some environmental features. Studies in the literature investigate the relationship between similar variables and environmental literacy level. Similar to our results, Kayalı (2018) found that environmental literacy levels of female students are higher than male students in their study on teacher candidates [21]. Demirtaş Akbulut and Özşen (2018) determined in their study on vocational high school students that their environmental literacy levels were high. In addition, they concluded that the environmental literacy levels of the students differ based on their gender, environmental education, foreign experience and the programs they studied [7].

Similarly, Teksöz, Şahin and Ertepinar (2010) found out that female students had higher scores in attitudes towards the environment, uses related to the environment, and concern for environmental problems, while male students had higher scores in the environmental knowledge sub-dimension [22].

**Table 2.** Descriptive statistics of the environmental literacy scale (N = 292)

Sub-dimension	Highest possible score	Min.	Max.	Mean $\pm$ SD
Environmental Knowledge	20	3	19	12.23 $\pm$ 2.96
Environmental Attitude	90	22	85	66.11 $\pm$ 12.25
Environmental Behaviour	60	20	60	41.22 $\pm$ 6.38
Environmental Perception	15	3	15	10.26 $\pm$ 2.08

Kocalar and Balcı (2013) concluded that the environmental literacy levels of students are relatively high, and as the grade level increases, the environmental literacy level also increases [23]. Altınöz (2010) found that the environmental knowledge level of female students was significantly high in his study on science teacher candidates [24]. Şahin, Ünlü and Ünlü (2016) determined that there is a significant difference between the environmental literacy scores of 4th-grade students according to their department [8]. Artun, Uzunöz and Akbaş (2013) found that environmental literacy levels of students were not affected by factors such as gender, the school they graduated from, the education level of the mother and the father [25]. Studies show that generally female students have higher scores. It is thought that this may be due to women's nature. Since women are more sensitive and responsible than men, they may act more consciously towards the environment.

Yavetz et al. (2009) investigated the student's environmental attitude, environmental knowledge, environmental behaviour and the relationship between these variables and demographic characteristics in their study with three colleges that train teachers in Israel. They concluded that although the students' environmental knowledge was limited, their general attitudes towards the environment were positive. In addition, a positive relationship was found between students' environmental knowledge and environmental attitudes and mother's education level. It was determined that students who receive education on environmental issues are more knowledgeable and have more positive attitudes towards the environment than other students [9]. Liu et al. (2015) found out that teachers in Taiwan have a good environmental knowledge and attitude levels, but low environmental action. In addition, they concluded that primary school teachers performed better than high school teachers [26]. Shamuganathan and Karpudewan (2015) investigated the variables of environmental knowledge, environmental attitude, belief, conservation awareness, and responsible environmental behaviour to model the environmental literacy of high school seniors in

Malaysia. It was found that students responsible environmental behaviour level and their level of knowledge about environmental problems were high. However, it was specified that individuals with a confident attitude, belief and awareness of protection are more prone to exhibit responsible environmental behaviour [27].

Our study found that the students whose father's educational level was university were higher environmental knowledge. Similarly, Güler (2013) found that students whose fathers are university graduates have higher levels of environmental knowledge [28]. On the other hand, Bilim (2012) concluded that there was no significant difference between the education levels of the parents of the students and their environmental knowledge levels [29]. In addition, it was found that students whose parents graduated from high school have higher levels of environmental knowledge, but this difference is not statistically significant [24]. It is thought that parents with a high level of education have a high sensitivity to the environment and bring it to their children, therefore, children who grow up in educated families have higher environmental literacy levels.

Our study, determined that receiving environmental education, being involved in the environmental project, talking about environmental issues in the family, obtaining information from an instructor, and being a member of a non-governmental organization related to the environment provide the students to increase their average score. This result indicates that being sensitive to environmental issues and taking action on these issues positively affect the level of literacy. Therefore, it is believed that activities such as membership in environmental non-governmental organizations and participation in environmental responsibility projects will effectively raise the environmental literacy level of students. Similar to our results, it was determined that students interested in the environment and environmental problems, participate more in environmental activities, spend more time in nature, and have higher levels of environmental literacy [30, 31]. It is obvious that the participation of university students in environmental activities has positive

effects on environmental literacy. For this reason, it is recommended that environmental organizations work actively in universities and organize environmental campaigns.

## Conclusion

Nursing students, who will be included in health care professionals in the future, are expected to have a high level of environmental knowledge, attitude, behaviour and perception towards the environment, in other words, to be environmentally literate individuals. In this study, it was found that the environmental literacy level of nursing students was moderate. Therefore, it is crucial to carry out studies that will improve the environmental literacy levels of students. For this purpose, it is recommended that students take environmental literacy courses during their university education or make regulations on the quality and content of the existing courses. Interventional studies can be conducted to increase students' environmental knowledge and transform their existing environmental attitudes into behaviour. The study determined that participating in an environmental project, being a member of environmental non-governmental organizations, and talking about environmental issues within the family had a positive effect on environmental attitude, behaviour, and perception. However, it was seen that only 18.8% of the students were involved in project work, 5.5% were members of a non-governmental organization and 22.9% talked about environmental issues in the family (Table 1). In other words, despite the positive effects of these three variables, it is understood that very few students have these features. In line with these results, it can be ensured that students are directed to environmental project studies or their participation in current projects on this subject can be increased. The literature has observed that the studies on the environmental literacy level of nursing students are very limited, and the studies are generally carried out for teacher candidates. In line with these results, our recommendations are as follows; 1) Interventional studies should be carried out with larger samples on the environmental literacy levels of nursing students, 2) Universities should initiate programs to increase environmental

awareness and sensitivity of students, especially with the participation of non-governmental organizations, 3) Students should be included in social responsibility projects related to environmental problems, 4) Environmental courses can be included in the nursing curriculum.

**Limitations:** This study was conducted in a single university and the sample was relatively small. Hence the results cannot be generalized.

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## Data availability statement

The datasets generated during and/or analysed during the current study are available from the corresponding author on reasonable request.

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## Conflict of interest

There are no conflicts of interest with respect to the authorship and/or publication of this article.

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