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Environmental Literacy Levels of Nursing Students: A Descriptive Study

Hemşirelik Öğrencilerinin Çevre Okuryazarlık Düzeyleri: Tanımlayıcı Çalışma

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ABSTRACT Objective: Environmental literacy is vital to form a positive and close relationship between environment, education and health. This study aimed to determine the environment literacy levels of the nursing students. **Material and Methods:** This descriptive study was conducted on 254 undergraduate nursing students, who studied at the department of nursing at a private university in Northern Cyprus in the spring semester of the 2020-2021 academic year. Personal information form and environmental literacy scale for adults were used for data collection. Percentage, Kolmogorov-Smirnov test, Mann-Whitney U test and Kruskal-Wallis H test were used in the statistical analysis of the data. **Results:** Environmental literacy levels of the nursing students were high. Female participants had higher levels of environmental consciousness. Besides, environmental literacy levels of the participants, who lived for the longest time in villages, had higher levels of environmental literacy. Finally, environmental awareness levels of the participants were higher for the participants, who had higher paternal education levels and were members of environmental organizations. **Conclusion:** As a result, environmental literacy levels of nursing students were found to be high. Further studies on the roles and the effects of higher education institutions and environmental organizations may be conducted to improve environmental literacy among the nursing students. It is recommended that students become members of environmental organizations or environmental clubs at the university.

Keywords: Environment; nursing students; literacy; environmental literacy

ÖZET Amaç: Çevre, sağlık ve eğitim arasında yakın bir ilişki kurmak için çevre okuryazarlığı hayati önem taşımaktadır. Bu araştırma, hemşirelik bölümünde öğrenim gören öğrencilerin çevre okuryazarlık düzeylerinin belirlenmesi amacıyla gerçekleştirilmiştir. **Gereç ve Yöntemler:** Araştırma tanımlayıcı araştırma tasarımına uygun olarak gerçekleştirilmiştir. Araştırmanın örneklemini, Kuzey Kıbrıs'taki bir vakıf üniversitesinde 2020-2021 öğretim yılı bahar döneminde öğrenim gören 254 hemşirelik lisans öğrencisi oluşturmuştur. Araştırmada veri toplama aracı olarak Tanıtıcı Bilgi Formu ve Çevre Okuryazarlık Ölçeği kullanılmıştır. Verilerin istatistiksel analizinde yüzdelik, Kolmogorov-Smirnov testi, Mann-Whitney U testi ve Kruskal-Wallis H testi kullanılmıştır. **Bulgular:** Yapılan çalışmada, hemşirelik öğrencilerinin çevre okuryazarlık düzeyleri yüksektir. Kadın öğrencilerin çevre bilinci erkeklere göre yüksek bulunmuştur. Köyde yaşayanların çevre okuryazarlık düzeyleri şehirde yaşayanlara göre daha yüksek görülmüştür. Ayrıca baba eğitim düzeyi yüksek olanların ve çevre kulüplerine üye olanların çevresel farkındalık düzeylerinin yüksek olduğu belirlenmiştir. **Sonuç:** Sonuç olarak yapılan çalışmada, hemşirelik öğrencilerinin çevre okuryazarlık düzeyleri yüksek bulunmuştur. Çevre okuryazarlığının yükseltilmesi için yükseköğretim kurumları ile çevresel kuruluşların rolü ve etkisine yönelik çalışmalara ağırlık verilmesi önerilmektedir. Öğrencilerin çevre kuruluşlarına ya da üniversitede yer alan çevre kulüplerine üye olmaları önerilmektedir.

Anahtar Kelimeler: Çevre; hemşirelik öğrencileri; okuryazarlık; çevre okuryazarlığı

Environmental problems in today's world, including global warming, deforestation, ozone depletion, air pollution and exhaustion of natural resources, have reached to alarming levels.[1] All societies have important responsibilities to solve these global problems.[2] Environment is the natural space, in which the living creatures interact with one another and survive physical, biological, socio-economic and cultural life.[3] According to the environmental scientists, sustainable consumption

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behaviors and life styles of the citizens are the keys to solve environmental problems.[4] Human beings interact with the environment and other living creatures throughout their lives.[5]

Environmental literacy is vital to form a positive and close relationship between environment, education and health. Although it has various definitions, common points in defining environmental literacy are knowledge, awareness, sensitivity and responsibility towards the functioning of the natural systems and the effects of humans on these systems.[1] Environmental literacy may be defined as raising knowledge, awareness and positive attitudes towards the environment.[6] It is related with nearly all individuals at all age groups or the stages of education.[4,7] It is widely accepted that environmental literacy may contribute to not only the basis of environmental awareness but also the transition to a healthy and sustainable society.[4] In this sense, improving environmental literacy in daily life has a vital role for the protection of the environment. Therefore, students should be informed about the effects of environmental problems on human health.[5]

Environment is one of the key concepts of nursing education. Environmental health should be developed for community health.[8] The model proposed by Florence Nightingale, who underlined the importance of environmental health for the treatment of the soldiers during the Crimean War, focused on basic factors, such as clean water and air, effective filtration, sanitation and illumination, to sustain environmental health.[9,10] International Council of Nurses (ICN) chooses a theme every year to celebrate International Nurses Day. In 2017, the theme of the International Nurses Day was "Nurses: A voice to lead- Achieving the Sustainable Development Goals." The ICN identified 17 aims, including four aims related with the environment and environmental health.[11]

Although young people do not have the primary responsibility for the current environmental problems, they will be the people that will suffer from the negative effects of these problems the most. Due to this reason, raising social awareness on the protection of environment and maintaining environmental health are highly important for the nursing students.[12] Oğuz et al. conducted a research on 213 undergraduate students and found that the level of awareness on environment and environmental health were relatively low.[13] Ardoin et al. reported that the knowledge of the twelfth-grade students on environment was inadequate but environmental education had positive effects.[14] Similarly, the study of Liu et al. reported the positive effects of environmental education on environmental ethics and literacy.[15] The review of the existing studies revealed that lack of knowledge was one of the primary reasons behind the students' inability to practice healthy behaviors about environment. In order to prevent environmental problems, people should be educated about their responsibilities towards the nature and should exhibit environmentally-friendly behaviors. Environment education should take place in all stages of education so that a healthy environment may be provided to the future generations.[1]

The review of the literature reveals that the number of studies on environmental literacy among the nursing students studying in Northern Cyprus was limited. Environmental literacy and health were among the important subjects of nursing. As health professionals of the future, one of the important roles of the nursing students is health education. They will provide health education to all segments of the society and will contribute to the protection and the development of environmental health. Therefore, the level of environmental literacy among the nursing students and the factors affecting their levels should be determined to improve environmental literacy. Within this context, this study was an attempt to contribute to the literature by analyzing the environmental literacy levels of the students.

Research questions:

1. How is level of environmental literacy among nursing students?

2. Is there a relationship between sociodemographic characteristics of the nursing students and environmental literacy level?

MATERIAL AND METHODS

TYPE OF RESEARCH

This is a descriptive study.

STUDY DESIGN AND SAMPLE

The universe of the study consisted of 319 undergraduate students, who studied at the department of nursing of a private university in Northern Cyprus in the spring semester of the 2020-2021 academic year. No sampling was conducted and the study included 254 voluntary participants, comprising 80% of the population. Sixty five students were excluded from the study, including 4 four students, who refused to participate, and 59 students, who did not take part in the lecture during data collection. Students who did not accept to participate in the study and filled the questionnaire incompletely were not included in the study. Nursing undergraduate students who voluntarily accepted to participate in the research were included in the study.

DATA COLLECTION PROCESS

Data were collected during the spring semester of the 2020-2021 academic year. Given that the courses were online due to coronavirus disease-19 pandemic, data were collected online through Moodle (Moodle HQ, USA) and Microsoft Teams (Microsoft Corporation, Washington, USA). Participants were first asked to confirm the voluntary informed consent form and then were allowed to complete the online survey prepared using the Google Forms (Alphabet Inc., California Mountain View, USA) (https://docs.google.com/forms) in 20 minutes, after which the survey ended. As such, we intended to avoid the students to re-complete the survey. Besides, given that the students may feel under pressure if the researcher was also the lecturer of the course, the researchers demanded other lecturers, who did not take part in the study, to ask the students to complete the online survey.

Student introductory form and environmental literacy scale for adults were used for data collection.

Personal Information Form

Personal information form was composed of 12 questions on age, gender, region where the participants lived for the longest time, parental educational level, membership to environmental organizations and prior knowledge on environmental literacy.[6,16]

Environmental Literacy Scale for Adults

Developed by Atabek-Yiğit et al., Environmental Literacy Scale for Adults (ELSA) was composed of three subscales with 20 items, including Environmental Consciousness (items 1-6), Environmental Anxiety (items 7-12) and Environmental Awareness (items 13-20).[13] Items were scored on a 5-point Likert scale, ranging from 1 (strongly disagree) to 5 (strongly agree). There is no reverse coded item in the scale. Possible scores ranged between 20 and 100, with higher scores indicating a higher level of environmental literacy. Cronbach's alpha of the original scale and our study were 0.881 and 0.866, respectively.

STATISTICAL ANALYSIS

For data analysis SPSS version 25.0 (IBM Corp., Armonk, NY) was used. Frequency analysis was used for descriptive characteristics. For determine the scores obtained from the ELSA Kolmogorov-Smirnov test was used. Non-parametric tests were used for the analyses. Mann-Whitney U test was used to analyze the relationship between the ELSA scores and the descriptive variables of gender, prior knowledge on environmental literacy and membership to environmental organizations. On the other hand, Kruskal-Wallis H test was used to analyze the relationship between the ELSA scores and the descriptive variables of age, parental education level and the region where the participants lived for the longest time. Statistical significance was set at $p<0.05$.

ETHICAL CONSIDERATIONS

Prior to data collection, we obtained ethical approval from the Research and Publications Ethics Board of the Eastern Mediterranean University (date: December 17, 2020, no: 2020-0080). We taked permission from the Department of Nursing at Eastern Mediterranean University. Besides, participants were informed about the aim and the scope of the research and their written informed consent was obtained online. The study was performed according to the principles of Helsinki Declaration. Finally, we obtained permission to use the ELSA via e-mail.

RESULTS

The ELSA and its subscales mean scores of environmental consciousness, anxiety and awareness were

TABLE 1: Scores obtained from the ELSA (n=254).

	Average±SD	Minimum-maximum
Environmental consciousness subscale	24.88±2.93	14-30 (6-30)
Environmental anxiety subscale	25.92±2.95	12-30 (6-30)
Environmental awareness subscale	33.41±3.74	18-40 (8-40)
ELSA total	84.21±8.31	49-100 (20-100)

ELSA: Environmental Literacy Scale for Adults.

84.21±8.31 (49-100), 24.88±2.93 (14-30), 25.92±2.95 (12-30), and 33.41±3.74 (18-40) (Table 1).

Table 2 presented the findings on the relationship between the ELSA scores and characteristics of the students. There was no significant difference between the age groups and environmental consciousness and anxiety scores of the participants (p>0.05).

TABLE 2: Relationship between ELSA scores and descriptive characteristics (n=254).

Characteristics	n	%	ELSA total	Environmental consciousness	Environmental anxiety	Environmental awareness
Age						
18-19 years	75	29.53	84.36±6.99	25.24±2.30	26.08±2.45	33.04±3.40
20-21 years	144	56.69	83.48±9.01	24.65±3.22	25.63 ±3.20	33.19±3.93
22 years and above	35	13.78	86.89±7.48	25.06±2.87	26.74±2.75	35.09±3.23
KW			3.258	1.015	3.311	8.675
p value			p=0.196	p=0.602	p=0.191	p=0.013*
Gender						
Female	170	66.93	84.91±7.63	25.16±2.63	26.15±2.64	33.60±3.61
Male	84	33.07	82.79± 9.43	24.32±3.41	25.44±3.47	33.02±3.99
Z			-1.844	1.971	-1.755	-1.434
p value			p=0.065	p=0.049*	p=0.079	p=0.151
Regions where the participants lived for the longest time						
Village	70	27.56	86.99±6.58	26.01± 2.18	26.44± 2.55	34.53± 3.16
District	81	31.89	82.68±7.60	24.25± 2.93	25.52± 2.65	32.91± 3.44
Central District	103	40.55	83.52±9.43	24.61± 3.17	25.87± 3.38	33.04 ±4.18
KW			11.228	16.377	4.379	8.433
p value			p=0.004*	p=0.000*	p=0.112	p=0.015*
Maternal education level						
Primary school	134	52.76	85.13±7.82	25.20±3.08	26.07±2.68	33.87±3.42
Secondary school	47	18.50	84.00±8.80	24.53±3.20	25.98±2.99	33.49±3.82
High school	49	19.29	82.14±9.33	24.27±2.37	25.49±3.68	32.39±4.20
University and above	24	9.45	83.67±7.37	25.04±2.39	25.83±2.79	32.79±4.06
KW			4.504	7.009	0.650	4.449
p value			p=0.212	p=0.056	p=0.885	p=0.217
Paternal education level						
Primary school	91	35.83	81.68±9.35	25.03±2.79	26.09±2.92	32.34±3.97
Secondary school	51	20.08	84.08±7.34	25.00±2.63	25.94±2.46	33.14±3.07
High school	65	25.59	85.22±8.06	24.09±3.23	25.25±3.47	34.10±3.80
University and above	47	18.50	85.89±7.64	25.55±2.93	26.49±2.64	33.85±3.69
KW			8.308	6.218	4.266	9.721
p value			p=0.040*	p=0.101	p=0.234	p=0.021*
Prior knowledge on environmental literacy						
Yes	135	53.15	85.76±8.56	25.30±3.06	26.36±3.06	34.10±3.76
No	119	46.85	82.45±7.68	24.40±2.71	25.42±2.76	32.62±3.57
Z			-3.281	2.829	-2.990	-3.180
p			p=0.001*	p=0.005*	p=0.003*	p=0.001*
Membership to environmental organizations						
Yes	9	3.54	89.22±7.07	26.56±2.40	26.67±2.45	36.00±3.24
No	245	96.46	84.02±8.31	24.82±2.93	25.89±2.97	33.31±3.73
Z			-1.764	-1.840	-0.719	-2.115
p value			p=0.078	p=0.066	p=0.472	p=0.034*

Z, Mann-Whitney U; KW, Kruskal Wallis; *p<0.05; ELSA: Environmental Literacy Scale for Adults.

However, there was statistically significant difference between the environmental awareness and the age groups of students (p<0.05). Environmental awareness scores of the participants older than 21 years of age (35.09±3.23) were significantly higher than the scores obtained by the younger participants (33.04±3.40) (Table 2).

We also found a statistically significant difference between gender and the score obtained from the environmental consciousness subscale of the ELSA (p<0.05) (Table 2). Environmental awareness scores of female participants were significantly higher than their male counterparts. However, according to total score and subscales there wasn't any significant difference (p>0.05).

Thirdly, there is significantly differences between ELSA total, environmental consciousness and awareness scores and the region where the participants lived for the longest time (p<0.05) (Table 2). Participants, who lived for the longest time in villages (26.01±2.18) obtained a statistically significant score from the environmental consciousness subscale compared to the participants, who lived in districts (24.25±2.93) and central districts (24.61±3.17). Besides, environmental awareness scores of the participants who lived for the longest time in villages (34.53±3.16), was higher (32.91±3.44). Participants, who lived for the longest time in villages (86.99±6.58) had a significantly higher ELSA score that the participants, who lived in districts (82.68±7.60) and central districts (83.52±9.43).

Regarding the parental education, we found no significant difference between maternal education level and the scores obtained from the ELSA and its subscales (p>0.05) (Table 2). Similarly, there was no significant difference between paternal education level and the scores obtained from the environmental consciousness and anxiety subscales (p>0.05). However, we found a statistically significant difference between paternal education level and environmental awareness scores (p<0.05). Environmental awareness scores of the participants, whose fathers were graduates of high school (34.10±3.80) were significantly higher than the participants, whose fathers were graduates of primary school and below (32.34±3.97). Furthermore, there was a statistically significant difference between paternal education level and the total ELSA scores (p<0.05). Total ELSA scores of the participants, whose fathers were graduates of high school (85.22±8.06) and university (85.89±7.64), were significantly higher than the participants, whose fathers were graduates of primary school (81.68±9.35).

There was no significant difference between membership to an environmental organization, total ELSA scores and the scores obtained from the environmental consciousness and anxiety subscales (p>0.05) (Table 2). Although the total ELSA scores of the participants with membership to an environmental organization was higher than the participants without membership. Also it was found difference between membership to an environmental organization and environmental awareness scores (p<0.05). Environmental awareness scores of the participants, who were members of environmental organizations (36.00±3.24) were significantly higher than the participants without membership (33.31±3.73).

DISCUSSION

Universities should graduate students with environmental responsibility in order to sustain a healthy environment. To achieve this goal, environmental literacy levels of the university students should be first determined and then improved.[17] Within this context, this part discussed our findings with reference to the findings of other studies.

Total ELSA scores of the participants of our study were relatively high (Table 1). Arnon et al. found that ELSA of the students was at moderate levels.[18] On the other hand, Sarabi et al. reported that the ELSA levels of the undergraduate students of medical sciences were low.[5] Other studies reported that environmental literacy levels of the undergraduate student in different departments were moderate.[19,20] Relatively high levels of environmental literacy in our study may be explained with reference to the nursing curriculum, which have placed emphasis on environmental problems and raised environmental awareness. Within this context, it makes us think that nursing students, who are the health professionals and

policy-makers of the future, may undertake responsibilities about environmental education in higher education institutions and may play important roles to achieve sustainable development targets of Türkiye.

Environmental awareness levels of the participants were higher than their environmental anxiety and consciousness levels (Table 1). University students in the study of Goldman et al. had high levels of environmental awareness and consciousness.[21] Liu and Guo reported that the university students achieved the highest scores from the environmental consciousness subscale.[22] Parallel to our findings, the study of Koç et al. on science teacher candidates found that the participants had high level of environmental consciousness.[23] Contrary to our findings, Lloyd-Strovas et al. reported that environmental consciousness levels of the university students were low.[24] High level of environmental awareness in our study may be explained with reference to the fact that 53.15% of the participants had prior knowledge on environmental literacy.

Environmental consciousness levels of the female participants of our study were higher than their male counterparts (Table 2). The study of Sarabi et al. found that there wasn't any relationship between ELSA levels and gender of medical students.[5] Parallel to our findings, Gül et al. and Demirtaş et al., found that environmental consciousness levels of female were higher.[25,26] The study of Kayalı also found that the level of ELSA of the teacher was higher for the female participants.[27] Based on these findings, we may suggest that male participants may be encouraged to participate in environmental activities and organizations to raise their awareness.

Existing studies revealed the effects of the type of place of residence on the interaction with environment.[25,28] The participants, who lived for the longest time in villages, had higher levels of environmental literacy, consciousness and awareness (Table 2). Contrary to our findings, the study of Küçükbaş-Duman and Atabek-Yiğit reported that the environmental literacy levels of the workers, who spent most of their lives in urban areas, were higher than those spending most of their lives in villages.[29] Similarly, Demirtaş et al. reported that there was no significant relationship between the type of place of residence and environmental literacy levels.[26] Karatekin and Aksoy, on the other hand, found that the teacher candidates of social studies, who had high levels of environmental curiosity, participated in environmental activities and spent time in natural environment, had higher levels of environmental literacy.[30] Spending time in natural environment and engaging in environmental activities may help us to learn more about the environment. Due to this reason, we may suggest that the participants, who lived in villages for the longest time, might have realized the importance of the environment for human life, so that their environmental consciousness and awareness were higher.

Education is the key to raise global awareness and consciousness on environment.[25] One-fourth of the fathers of the participants of our study were graduates of high school. We found that environmental literacy levels increased as paternal education levels increased (Table 2). The study conducted in Iranian with university students did not find a relationship between levels of parental education and EL.[5] Drajea and O'Sullivan reported that low levels of parental education had a negative impact on academic success of children in rural Uganda.[31] Parental education status may have a significant impact on raising environmentally-aware and responsible children. Internet and social media are among the key sources of information for learning about environmental problems. Therefore, social media may be used to improve the level of environmental literacy among the children and their parents.[32]

Concerns about environment have positive effects on environmental literacy.[27] Environmental awareness of the participants, who were members of environmental organizations, were significantly high. Similarly, environmental literacy levels of the science teacher candidates with a membership to any environmental organization were high in the study of Koç and Karatekin.[33] Another study on nursing students studying in North Cyprus reported that the students participated organizations about the environmental has higher sensitivity.[34] Tamam et al. also reported that the medical students, who were

interested in environment and took part in environmental activities, had more positive attitudes towards environment.[35] Activities of non-governmental organizations on environment may be effective to encourage environmentally-friendly behaviors and improve environmental awareness. Given that the nature is the best place to improve environmental consciousness and awareness, we may suggest that the students may be encouraged to be a member of environmental organizations and participate in their activities, including tree-planting and recycling.

LIMITATIONS

Our study was conducted in a single Turkish nursing department of a single university; therefore, the findings may not be generalizable.

CONCLUSION

This study found that nursing students has high level of ELSA. Besides, female students ELSA levels were higher than male. Furthermore, the participants who lived for the longest time in village had higher levels of ELSA. We found that ELSA increased as the level of paternal education increased. Besides, environmental awareness levels of the participants, who were members of environmental organizations, were higher. It is important for nursing students to have a high level of environmental literacy as it can raise awareness about the environment and environmental health. In this way, it is thought that it will help reduce diseases caused by environmental factors.

Based on these findings, we may suggest that the roles of higher education institutions and environmental organizations may be improved to raise awareness on environment and to improve environmental literacy. Strategies to provide environmental education in natural environment may be developed and the participation of the male nursing students to environmental activities and organizations may be encouraged. In addition to the curriculum, mass education and awareness campaigns may be conducted to encourage the participation of nursing students in activities related with environment.

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Conflict of Interest

No conflicts of interest between the authors and / or family members of the scientific and medical committee members or members of the potential conflicts of interest, counseling, expertise, working conditions, share holding and similar situations in any firm.

Authorship Contributions

Idea/Concept: *Melike Doğal, Hülya Fırat Kılıç;* ***Design:*** *Melike Doğal, Hülya Fırat Kılıç;* ***Control/Supervision:*** *Hülya Fırat Kılıç;* ***Data Collection and/or Processing:*** *Melike Doğal;* ***Analysis and/or Interpretation:*** *Melike Doğal, Hülya Fırat Kılıç;* ***Literature Review:*** *Melike Doğal, Hülya Fırat Kılıç;* ***Writing the Article:*** *Melike Doğal, Hülya Fırat Kılıç;* ***Critical Review:*** *Melike Doğal, Hülya Fırat Kılıç;* ***References and Fundings:*** *Melike Doğal, Hülya Fırat Kılıç;* ***Materials:*** *Melike Doğal, Hülya Fırat Kılıç.*

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