OFFICIAL TITLE OF THE STUDY

The Impact of Multidimensional Education on Nursing Students' Sustainable Environment Attitudes and Awareness of Climate Change

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Study design

This research was designed as a quasi-experimental single-group pretest-posttest study.

Samples and settings

The research was conducted in the Spring Semester of the 2025-2026 Academic Year. The population of the study consisted of all students enrolled in the first year of the nursing department of the faculty of nursing at a state university in Istanbul (n=140). In the study, which aimed to reach all students in the population, 76% of the students were reached (n=106). No power analysis was performed to estimate the sample size; instead, as it was an educational intervention, all students who wished to participate in the study were included.

Inclusion criteria for students in the study

Students were included in the study according to the criteria of being first-year undergraduate nursing students and voluntarily participating in the study. Those who refused to participate and those who did not complete any of the last two assessment tests were excluded from the sample.

Intervention

Before the data collection phase of the study, all first-year nursing students covered the topic of "Environment," one of the fundamental concepts of nursing, within the scope of the History of Nursing and Conceptual Framework course. A pretest was administered to all students who voluntarily agreed to participate in the study and received the necessary information; in this context, participants were asked to fill out the "Socio-Demographic Characteristics Information Form," the "Sustainable Environment Education Attitude Scale," and the "University Students' Awareness Scale Towards Global Climate Change." Afterwards, the intervention process, which included expert and peer training, was initiated.

In the first stage of this process, a training session titled "Sustainable Environment and Healthcare Settings" was organized for all students in the study group by the expert educator, who is the institution's environmental engineer.

In the second stage, a peer training session titled "Sustainable Environment, Health and Climate Change" was conducted by a third-year nursing student (peer educator) who serves as the president of the university's environment club. The peer educator's competence for this role is supported by the mentoring training she completed one year ago within the scope of our university's "Peer Mentoring Program" and by the fact that she is currently actively mentoring first-year students.

As the final step of the intervention process, all participants watched a short animated video created with artificial intelligence and reviewed by expert opinion. Immediately after the completion of all these multidimensional intervention components (expert training, peer training, and animation viewing), the first posttest of the study was administered. To ensure that

students fully adopted sustainable environment attitudes, the second posttest of the study was administered four weeks later.

Data collection

The data collection process of the study was carried out in three stages. In the first stage, the pretest was administered following the completion of the 'Environment' topic in the History of Nursing and Conceptual Framework course. In the second stage, the first posttest was conducted immediately after the educational intervention consisting of expert training, peer training, and animation viewing. In the third stage, the second posttest was repeated with the same measurement tools four weeks after the educational intervention.

Data collection

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Data collection tools

The "Informed Voluntary Consent Form," the "Socio-Demographic Characteristics Information Form," the "Sustainable Environment Education Attitude Scale," and the "University Students' Awareness Scale Towards Global Climate Change" were used to collect the research data.

Socio-Demographic Characteristics Information Form

It is a questionnaire form consisting of 10 questions, prepared by the researcher in line with the literature, covering students' personal and sociodemographic characteristics (gender, age, economic status, the longest place of residence).

Sustainable Environmental Education Attitude Scale

It was developed by Afacan and Güler (2011). The "Sustainable Environment Education Attitude Scale" consists of 30 items. The scale is scored on a 5-point Likert type. The measurement tool consists of 6 factors in total. The factors that make up the scale are categorized as consciousness towards sustainable environment, negative thoughts, voluntariness, frugality, sensitivity, and economical consumption. The Cronbach's alpha internal consistency value of the attitude scale was reported as 0.90. The obtained value represents that the scale is reliable.

Awareness Scale of University Students About Global Climate Change

Developed by Deniz and colleagues in 2021, the scale measures awareness towards global climate change in university students. The scale, consisting of 21 items, consists of four sub-dimensions. Each item is coded on a 5-point Likert type as '1= Not aware at all, 2= Not aware, 3= Undecided, 4= Aware, 5= Fully aware'. There is no reverse-coded item in the scale. The highest score that can be obtained from the scale is 105; the lowest is 21. High scores indicate that awareness regarding global climate change is high. In addition, after dividing the total mean scores for the scale and its sub-dimensions by the number of items, a range of 1-2.33 is interpreted as low, 2.34-3.66 as medium, and 3.67-5.00 as high awareness.

Statistical Analysis Plan

Data will be analyzed using IBM SPSS Statistics version 26. Descriptive statistics will be presented as frequencies and percentages for categorical variables and means and standard deviations for continuous variables. The distributional characteristics of continuous variables will be assessed using the Shapiro–Wilk test and visual methods, including histograms and Q-Q plots.

Changes in the primary outcomes, namely sustainable environmental attitudes and awareness of global climate change, across the three assessment time points (baseline, immediately after the intervention, and four-week follow-up) will be evaluated using a one-factor repeated measures analysis of variance (repeated measures ANOVA). When the overall repeated measures ANOVA is statistically significant, Bonferroni-adjusted pairwise comparisons will be performed to identify differences between assessment time points.

The assumption of sphericity will be assessed using Mauchly's test. If the assumption of sphericity is violated, an appropriate correction, such as the Greenhouse–Geisser correction, will be applied.Effect sizes will be reported using partial eta squared (η^2p), where applicable. Statistical significance will be set at $p < 0.05$.