

Environmental awareness and sustainable consumption behaviours of Turkish nursing students

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Objectives. This study aims to determine the environmental awareness and sustainable consumption behaviours of nursing students.

Methods: This cross-sectional study was conducted with 380 undergraduate nursing students studying at the Faculty of Nursing, Ege University, Türkiye. The Personal Information Form, Environmental Awareness Scale (EAS), and Sustainable Consumption Behaviours Scale (SCBS) were used to collect the research data. Number, percentage, mean, Kolmogorov-Smirnov Z test, t-test, one-way analysis of variance, Pearson's correlation test, and linear regression analysis were used in statistical evaluation.

Results. The mean total score on the EAS was 46.12 ± 6.60 , and the mean total score of the SCBS was 61.83 ± 9.10 . A significant, moderate, and positive correlation was found between students' environmental awareness and sustainable consumption behaviours. Moreover, students' gender and the people they lived with caused statistically significant differences in the EAS score. The people students lived with, the place where they lived for the longest time, and their perceived income level caused statistically significant differences in the SCBS score.

Conclusions. Nursing students had high environmental awareness and moderate to good sustainable consumption behaviours. It is necessary to include the contribution of sustainable practices to the environment and the effects of these practices on human health in curricula for nurses and, thus, provide environmental awareness to students

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Abstract

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Keywords. Environmental awareness, Nursing students, Sustainable consumption behaviours.

Introduction

The world population is expected to reach 9 billion by 2050. Rapid population growth increases the production and consumption cycle, and the use of health services and causes the deterioration of planetary health (Lenzen *et al.*, 2020). In 2015, the 193 countries that make up the United

Nations (UN) agreed to adopt the 2030 Agenda for Sustainable Development to eliminate poverty, protect planet Earth, combat climate change and ensure that all people live in prosperity. The 12th ~~goal, one of~~ Sustainable Development Goals (SDGs), is responsible production and responsible consumption. Responsible production and responsible consumption are an environmentally responsible behaviour that defends nature and protects ecology (Yue *et al.*, 2020). It includes the elements of purchasing recyclable products, using resources effectively, using energy economically, and respecting nature during the production phase (Doğan *et al.*, 2015). In the goal of responsible production and consumption, it is emphasized that we urgently need to reduce our ecological footprint by achieving economic growth and sustainable development and by changing the way we produce and consume goods and resources (Katila *et al.*, 2019). In Türkiye, rapid economic and population growth leads to excessive consumption of natural resources and aggravated deterioration of the ecological environment. The SDGs are also being developed in Türkiye. The UN's "2nd National Review of the SDGs" for Türkiye specified a shared vision and laid the foundation for achieving common goals (Kurt and Özbaş, 2023).

Healthcare institutions deliver services 24 hours and 7 days. Therefore, these are areas with immense energy consumption, waste production and intense environmental impacts. (Sapuan *et al.*, 2022). Healthcare systems are responsible for 4%–5% of the emissions of greenhouse gases worldwide (Rodríguez-Jiménez, *et al.*, 2023). Nurses, who constitute the majority of healthcare professionals, are key stakeholders in advancing health across the globe. Nurses have assumed the role of protective advocates for the planet besides caring for and educating individuals in society. Nurses can ~~take advantage of myriad opportunities to~~ engage and advance the UN 2030 the SDGs Agenda and take charge of change. Through strategic approaches to obtaining the SDGs targets, nurses will be able to improve quality of life for themselves and the public they serve (Rosa and Iro, 2019; Li *et al.*, 2021). The annual statement of the International Council of Nurses (ICN) (2018), the American Nurses Association (ANA) (2008), and the World Health Organization (WHO) (2020) emphasized the need for nurses to take immediate action in order to establish climate-resilient health systems (Kurt and Özbaş, 2023; Sherman *et al.*, 2023). The ICN has determined the 2017 theme as "Nurse: leading voice-Achieving SDGs" (Kıvanç *et al.*, 2020). Nurses and nursing students are expected to act as key advocates of sustainable production and consumption (Kurt & Özbaş, 2023; Sherman *et al.*, 2023).

Young generation, Z generation, should be aware of their environment and problems to make up the next generation. Generation Z members are more interested in the sustainability and responsibility ~~to a greater extent~~ than previous generations. They are also self-examining, more involved in environmental problems compared to the ~~X and Y~~ generations (Casalegno *et al.*, 2022). The review of various studies determined that environmental awareness and environmental knowledge were high in young generation (Yapici *et al.*, 2017; Ahamad and Ariffin, 2018; Lee *et al.*, 2019; Severo *et al.*, 2020; Anderson *et al.*, 2021; Arshad *et al.*, 2021). This generation avoids using products that harm the environment, and prefers environmentally

friendly products (Casalegno et al., 2022; Sakdiyakorn et al., 2021). It has been emphasized in some studies that nursing students are inadequately prepared to understand the relationships between use of resources, sustainability and health (Lopez-Medina et al., 2019; Álvarez-Nieto et al., 2022). ~~The concept of sustainable consumption is a new concept.~~ In order to create change in environmental and sustainability issues, it is necessary to first determine the situation of nursing students regarding the subject (Cruz et al., 2018). Although there are a very limited number of studies examining the sustainable consumption attitudes and behaviours of nursing students in different countries, there are no studies conducted with nursing students in Türkiye (Cruz et al. 2018; Lopez-Medina et al. 2019; Alvarez et al. 2022). Cruz et al. (2018) revealed that nursing students had very positive attitudes towards sustainability in healthcare. One study found that 42.7% of nurse students answered more than half of the energy knowledge questions correctly. The study indicated that sustainable behaviours were closely and positively related to attitude in contrast knowledge (Lee et al., 2019). There is a gap in the literature about the environmental awareness and sustainable consumption behaviours of nursing students. Therefore, this study aims to determine the environmental awareness and sustainable consumption behaviours of nursing students, who are the future members of the health profession.

The research hypotheses (H1) were as follows:

H1₁: Nursing students have high environmental awareness.

H1₂: Nursing students have high sustainable consumption behaviours.

H1₃: There is a relationship between the environmental awareness level and the sustainable consumption behaviours levels of nursing students

H1₄: Sociodemographic characteristics of nursing students affect their level of environmental awareness.

H1₅: Sociodemographic characteristics of nursing students affect their level of sustainable consumption.

Materials & Methods

Study design and sampling

This cross-sectional study was conducted at Ege University Faculty of Nursing located in the west of Türkiye between July and September 2021. Undergraduate nursing students of nursing faculty constituted the study population (N=1193). To determine the sample in the study, the sample formula with the known population was used

$(n = \frac{1193 \times 1.96^2 \times 0.42 \times 0.58}{0.05^2 \times 1192 + 1.96^2 \times 0.42 \times 0.58})$ (Erdoğan et al., 2014). The reference regarding the incidence of sustainable consumption behaviour (42%) was taken from the study results obtained by Kukkonen et al. (2018). With the calculation made accordingly 95% confidence interval, the sample size was determined to be at least 225 participants. The current study was completed with 380 volunteer undergraduate nursing students using a purposive sampling method. The Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) checklist was used in the study design and drafting of the manuscript.

Instruments and data collection

The ~~research~~ data were collected ~~online~~ through online forms using the Personal Information Form, Environmental Awareness Scale (EAS), and Sustainable Consumption Behaviours Scale (SCBS) (<https://forms.gle/>) after obtaining ethical approval from the Ethics Committee of Ege University (Date: June 25, 2021, Number: E.208620). The authors have permission to use the instruments from the copyright holders. The voluntary participation of nursing students was questioned before implementing the form. Nursing students who approved it answered the questions. The online instruments helped ensure that there were no missing data in the submitted responses. It took approximately 30 minutes to complete the instruments.

The **personal information form**, ~~which was prepared by the researchers by reviewing the literature~~, consists of 12 questions to identify the socio-demographic characteristics of nursing students (Richardson et al., 2016; Ntanos et al., 2018; Lee et al., 2019; Shaw et al. 2021).

The EAS developed by Alkaya et al. (2016) consists of 11 questions. Three subscales were obtained as a result of the factor analysis. The subscales are ecological awareness, self-awareness, and behavioural awareness. It is a 5-point Likert scale and is rated as 1: Strongly disagree, 2: Disagree, 3: Neither agree nor disagree, 4: Agree, 5: Strongly agree. The questions consist of statements to measure participants' environmental awareness and green product purchasing status. Cronbach's alpha value of the scale was found to be 0.815. An individual environmental awareness increases with the increasing score (Alkaya et al., 2016). In our study, Cronbach's alpha value of the scale was found to be 0.901. The Kolmogorov-Smirnov test was performed to examine the normal distribution suitability of the scale's mean score. It was revealed that the scale score **was suitable** for normal distribution ($p > 0.05$).

The SCBS was developed by Doğan et al. (2015) and consists of 17 questions. This measurement tool consists of 4 subscales. The subscales were defined as Environmental Awareness (5 items), Out-of Need Purchasing (5 items), Saving (4 items), and Reusability (3 items). Items in the environmental awareness sub-dimension include purchasing cleaning agents that are less harmful to the environment, purchasing clothes made of natural materials, paying attention to the fact that ~~what is purchased~~ can be degraded in nature, warning friends to raise awareness, and supporting companies that sell environmentally friendly products. Items in the Out-of-Need Purchasing sub-dimension include buying electronic devices, buying clothes, buying products off the list while grocery shopping, and stocking up on food, even if one does not perceive the need. Savings sub-dimension items include purchasing energy-saving electronic devices, using energy-saving light bulbs, and taking into account the amount of electricity consumption when purchasing. The reusability sub-dimension items include renting instead of purchasing products, recycling products such as cardboard and tin, and reusing used papers. The measurement tool with a 5-point Likert rating is scored as "Never (1)", "Very Rarely (2)", "Sometimes (3)", "Usually (4)", and "Always (5)." Reverse scoring is made in the subscale of "Out-Of Need Purchasing." In the SCBS, sustainable consumption behaviours increase to the same extent as the score increases. Its Cronbach's alpha coefficient is 0.771 (Doğan et al., 2015). In our study, Cronbach's alpha value of the scale was found to be 0.835. The Kolmogorov-

Smirnov test was conducted to examine the normal distribution suitability of the scale's mean score. It was found that the scale score **was suitable** for normal distribution ($p>0.05$).

Measurement

The dependent variables of the study are the EAS and the SCBS total scores. The independent variables of the study were nursing students' age, gender, class level, type of high school they graduated from, the people they lived with, the place where they lived for the longest time, their income level, and membership in any environmental organization.

Data analysis

Number, percentage, mean and standard deviation were used in the analysis of sociodemographic variables. Means and standard deviations were used in evaluation of scales. Whether the dependent variable showed a homogeneous distribution was analyzed with the Kolmogorov Smirnov Z test. One-way analysis of variance, independent t-test, Pearson's correlation test, Dunnett's t-test, and linear regression, which are parametric tests, ~~analysis~~ were used as hypothesis tests. The statistical significance level was considered as $p<0.05$ at a confidence interval of 95%.

Results

The mean age of nursing students was 21.88 ± 2.72 . Other sociodemographic characteristics of nursing students are shown in Table 1.

The mean ~~score on the EAS~~ **was found to be** 46.12 ± 6.60 . It was determined that nursing students scored 4.47 ± 0.80 points on average on the ecological awareness subscale, 4.18 ± 0.79 points on average on the self-awareness subscale, and 3.85 ± 0.82 points on average on the behavioural awareness subscale.

~~It was revealed that~~ gender of nursing students ($p=0.024$) and the people they lived with ($p=0.021$) caused a statistically significant difference in the mean score on the EAS. Higher EAS scores were found in female nursing students compared to males, nursing students living with their families compared to those living alone or with friends. ~~It was found that~~ nursing students' age, class level, type of high school they graduated from, the place where they lived for the longest time, and perceived income level were the independent variables not causing a difference (Table 2).

The linear regression model created to identify the independent variables predicting the environmental awareness levels of nursing students found no autocorrelation between the variables. The created model was found to be significant, linear, and good ($F=33.79$, $p=0.001$, Durbin Watson=2.227). It was revealed that 21.3 % of the change in the environmental awareness levels of nursing students was related to changes in gender ($p=0.016$), the people they lived with ($p=0.041$), and their sustainable consumption behaviours level ($p=0.001$). It was found that the standard deviation change in environmental awareness level was due to the 1.636 change in gender, the 2.052 change in the people they lived with and the 0.303 change in the SCBS total score (Table 3).

The mean score on the SCBS was 61.83 ± 9.10 . The mean score on the environmental awareness subscale was 3.24 ± 0.97 , the mean score on the out-of-need purchasing subscale was 2.20 ± 0.84 , the mean score on the saving subscale was 3.97 ± 0.97 , and the mean score on the reusability subscale was 3.54 ± 1.04 .

~~It was determined that~~ the people nursing students lived with ($p=0.005$), the place where they lived for the time ($p=0.001$), and their perceived income level ($p=0.026$) caused a statistically significant difference in the mean score on the SCBS. Nursing students living with their families compared to those living alone or with friends, those living in metropolitan cities compared to those living in villages, towns, and cities, participants who perceived their income less than their expenses compared to those who perceived it as equal or higher had higher SCBS scores (Table 2).

Pearson's correlation analysis analyzed the correlation between the EAS and SCBS mean scores. Accordingly, a positive, moderate, and statistically significant correlation was found between the two scales ($r=0.433$, $p=0.001$).

The linear regression model created to identify the independent variables predicting the sustainable consumption behaviour levels of nursing students found no autocorrelation between the variables. The created model was found to be significant, linear, and good ($F=23.967$, $p=0.001$, Durbin Watson=1.946). It was revealed that 20.4 % of the change in sustainable consumption behaviours levels of nursing students was only related to changes in the environmental awareness scale score ($p=0.01$). The standard deviation change in the sustainable consumption behaviour level was due to the 0.572 change in the environmental awareness level (Table 4).

Discussion

The nursing profession is a discipline that promotes the health of individuals and society in general. Moreover, it must contribute to climate change adaptation, reducing vulnerability to harmful effects, reducing or preventing greenhouse gas emissions. Undergraduate nursing students are the future of the profession. It is important to determine the environmental awareness and sustainable consumption behaviours of undergraduate nursing students in an era when we are increasingly witnessing the limits of the Earth's resources (*Álvarez-Nieto et al. 2022; Kurt and Özbaş, 2023*). However, there is no study to determine the sustainable consumption behaviours and environmental awareness of nursing students in Türkiye. The results of this research provided evidence for the environmental awareness and sustainable consumption behaviours of nursing students and made a valuable contribution to the literature by developing effective strategies for sustainable production and consumption which is its most significant aspect. These constitute the strength of the study.

In our study, nursing students had high levels of environmental awareness. The studies have indicated that young people studying in the field of health have higher environmental risk perceptions compared to young people studying in other fields (social, art, engineering, etc.) (*Yapici et al., 2017; Arshad et al., 2020; Moody-Marshall, 2023*). The high environmental awareness of nursing students is associated with the fact that the nursing education curriculum is

based on the concepts of human, health, disease and environment. These results reveal the importance of including environmental issues in the education years.

In our study, both pairwise analysis and the regression model for environmental awareness determined that nursing students' gender, the people the students lived with, and the SCBS score were the variables causing a statistically significant difference. Both our study and other studies in the literature identified that females had higher environmental awareness, environmental protection, and product use awareness than males (*Yapici et al., 2017; Vicente-Molina et al., 2018*). Active efforts of the ecofeminist movement to prioritize gender in environmental and climate change issues since the 1990s can explain the fact that women are more sensitive to the environment in the results obtained from both our study and other studies ~~in the literature~~ (*Liobikienė & Juknys, 2016; Samwel & Muradashvili, 2021*). The fact that the members of the nursing profession mostly consist of females may also be the reason for the high environmental awareness of students in our study. This should be regarded as an opportunity. *Della Valle (2019)* noted that place of abode and self-efficacy are influential factors of environmental practice. In our study, the people nursing students lived with caused a significant difference in their environmental awareness. It was determined that students living alone had lower environmental awareness compared to those living with their families. The reason for this may be that people living together provide social control by warning others.

Our study revealed that the sustainable consumption behaviours of nursing students were at a moderate to good level. In their study, *Ahamad and Ariffin (2018)* detected that although the majority of university students had high knowledge of sustainable consumption, they exhibited moderate sustainable consumption behaviours. *Vicente-Molina (2018)* determined that green/environmental product purchasing behaviours were exhibited at the lowest rate. Green and environmentally friendly products are more expensive and therefore younger generations cannot buy these products even though they are more motivated by environmental and social reasons (*Casalegno et al., 2022*). Considering Maslow's hierarchy of basic needs, while the priority of individuals with low income is needs such as food, shelter and clothing, achieving the desire for a better world may not be the primary goal (*Li et al., 2021*). Nursing students in Türkiye are generally children of families with a low socio-economic status (*Başkale&Serçekuş, 2015*). The reason why sustainable consumption behaviours are at a moderate-good may be the low economic level of nursing students.

~~It was found that~~ the people students lived with, the place where they lived for the longest time, and their perceived income level caused a statistically significant difference on the SCBS score. The place/geography where one lives is effective in shaping the values of an individual. Our study revealed that the sustainable consumption behaviours of students differed significantly according to the place where they lived for the longest time. Sustainable consumption behaviours of students living in metropolitan cities and villages were more positive compared to those living in towns and cities. Students living in the cosmopolitan and smallest settlements exhibited more positive sustainable consumption behaviours. *Anderson et al. (2021)* revealed that living in a rural-urban area affected university students' sustainable behaviours. *Li et al. (2021)*

hypothesized in their study that wealthier countries or cities may have higher awareness of sustainability or sustainable development. *Chekima et al. (2016)* found that having man–nature values was the most obvious determinant of purchasing green products. They determined that students living in rural areas were more sensitive to behaviours such as turning off the unused electricity source and turning off the tap while brushing their teeth compared to students living in urban areas. It is considered that students living in villages may have developed their man-nature values by living in harmony with nature, whereas these values in students living in metropolitan areas depend on their developed awareness of limited resources and environmental pollution.

The regression model created to determine the predictor variables for sustainable consumption behaviour determined that the EAS score was the predictor variable that caused a statistically significant difference. Awareness should be raised among students for the efficient use of resources. It is emphasized that environmental education is a subject that continuously attracts the attention of researchers worldwide and that increasing environmental awareness through formal education is a current issue (*Ntanos et al., 2018*). The results show that this issue, which is current and new, should emphasize the environment-human interaction.

Conclusions

Nursing students in this study had high environmental awareness and moderate to good sustainable consumption behaviours. There was a relationship between environmental awareness and sustainable consumption behaviours of nursing students. The most predictive variables in the environmental awareness of nursing students were their gender, the people they lived with, and their sustainable consumption behaviours. It was revealed that environmental awareness level was a significant predictor variable in sustainable consumption behaviours. The effect of demographic variables on the sustainable consumption behaviour of nurse students was limited.

An integrated form of an interdisciplinary curriculum can be developed to raise responsible environmental practice skills in young people outside the health disciplines, especially at the higher education level, for the desired environmental and sustainability awareness. For the desired behaviours to occur, it is recommended to examine in other studies why the behaviour and awareness of individuals, whose effects have been revealed in this study, differ according to gender and the people they live with.

This study has several limitations. First, the study was conducted at a nursing faculty in Türkiye. However, a high rate of participation was achieved, representing every class of the faculty. Moreover, in Türkiye, only the faculty where the study was conducted offers "environmental health nursing" and "sustainable health services and nursing" courses. For this reason, the results of the study can be generalized. Second, the EAS and the SCBS used in this study are generally intended to be used in all disciplines. In the literature, there are no scales for the effects of healthcare services or the nursing discipline. It is necessary to develop scales specific to nursing or healthcare services.

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Table 1(on next page)

The socio-demographic characteristics of the nursing students (n=380).

Characteristics	n	%
Age group		
17-22	207	54.5
22-26	173	45.5
Gender		
Female	269	70.8
Male	111	29.2
Class		
1	101	26.6
2	107	28.2
3	85	22.4
4	87	22.9
Graduated high school		
General high school	296	77.9
Science and technical high school	84	22.1
The people they lived with		
Parent	339	89.2
Friend/alone	41	10.8
The place where they lived for the longest period of time		
Village	59	15.5
Town	125	32.9
City	47	12.4
Metropolitan city	149	39.2
Perceived income level		
Income less than expenses	81	21.3
Income equal to expenses	260	68.4
Income more than expenses	39	10.3

Table 2 (on next page)

Comparison of the mean total scores of the Environmental Awareness Scale and the Sustainable Consumption Behaviors Scale based on nursing students' characteristics (n=380).

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Characteristics	Environmental Awareness Scale			Sustainable Consumption Behaviors Scale		
	M (SD)	t/F	p	M (SD)	t/F	p
Age group						
17-22	46.24 (5.97)	0.314*	0.754	60.85(9.58)	1.931*	0.056
22-26	46.02 (7.09)			62.66 (9.61)		
Gender						
Female	46.71 (5.54)	2.282*	0.024	61.93 (8.98)	0.331*	0.740
Male	44.71 (8.51)			61.59 (9.42)		
Grade						
1	46.51 (7.32)	0.514	0.673	61.45(10.52)	1.148	0.329
2	45.46 (6.84)			60.82 (8.69)		
3	46.28 (6.26)			62.25 (8.25)		
4	46.33(5.72)			63.13 (8.54)		
Graduated high school (HS)						
General HS	46.29 (6.71)	0.910*	0.364	62.31 (8.94)	1.913*	0.471
Science and technical HS	45.54 (6.21)			60.16 (9.49)		
The people they lived with						
Parent	46.53(5.98)	2.400*	0.021	62.29 (8.78)	2.830*	0.005
Friend/alone	42.75(9.86)			58.07(10.74)		
The place where they lived for the longest period of time						
Village	45.96 (7.83)	0.500	0.682	62.94(10.06)	5.777	0.001 d>a, a>b, b>c (0.001)**
Town	46.21 (5.31)			60.61 (9.20)		
City	45.10 (7.02)			58.06 (9.68)		
Metropolitan city ^d	46.43 (6.93)			63.59 (7.93)		
Perceived income level						
Income < expenses ^a	46.12 (7.86)	0.777	0.461	62.39 (8.24)	3.671	0.026 c<a,b (0.015)**
Income = expenses ^b	46.31 (6.21)			62.22 (7.68)		
Income > expenses ^c	44.89 (6.28)			58.12 (7.85)		

4 *Independent t test / One way ANOVA, ** Dunnett t test
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Table 3(on next page)

The predictive variables on environmental awareness of the nursing students (n=380).

Dependent Variable	Independent Variable	B	SE	t	p	Tolerance	VIF
Environmental Awareness	Constant	31.761	2.697	12.268	0.001		
	Gender	1.636	0.679	-2.260	0.016	0.956	1.036
	The people they lived with	2.052	1.001	2.026	0.041	0.945	1.058
	SCBS total score	0.303	0.034	8.739	0.001	0.979	1.021
	Model	R=0.462 Adj. R ² =0.213 Durbin Watson= 2.227 F= 33.759 p=0.001*					

* Linear regression analysis

Table 4(on next page)

The predictive variables on sustainable consumption behaviors of the nursing students (n=380).

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Dependent Variable	Independent Variable	B	SE	t	p	Tolerance	VIF
Sustainable Consumption Behaviors	Constant	38.576	3.883	9.931	0.001		
	The people they lived with	1.953	1.384	1.411	0.159	0.951	1.051
	The place where they lived for the longest	0.649	0.375	1.731	0.084	0.973	1.021
	Perceived income level	1.455	0.771	1.887	0.060	0.972	1.029
	EAS total score	0.572	0.065	8.864	0.001	0.967	1.034
	Model	R=0.452 Adj. R ² =0.204 Durbin Watson= 1.946 F= 23.967 p=0.001*					

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3 * Linear regression analysis

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