



Ann Med Res

Current issue list available at [Ann Med Res](https://annalsmedres.org)

Annals of Medical Research

journal page: [annalsmedres.org](https://annalsmedres.org)

# Examining the relationship between sustainability consciousness and physical activity in healthy young adults

Fatma Nur Taki<sup>a,</sup> , Musa Çankaya<sup>b,</sup> ,\*<sup>a</sup>Necmettin Erbakan University, Kamil Akkanat Faculty of Health Sciences, Department of Physiotherapy and Rehabilitation, Konya, Türkiye<sup>b</sup>Necmettin Erbakan University, Seydişehir Health Services Vocational School, Department of Therapy and Rehabilitation, Konya, Türkiye\*Corresponding author: [mcankaya@erbakan.edu.tr](mailto:mcankaya@erbakan.edu.tr) (Musa Çankaya)

## ■ MAIN POINTS

- Sustainable consciousness and physical activity levels of individuals studying in the field of health and physical activity in higher education are important.
- There is no relationship between sustainable consciousness and physical activity level in healthy young people.
- Sustainable consciousness sub-parameters knowledge, attitude and behavior (economic, social, environment) are significantly related to each other.

**Cite this article as:** Taki FN, Çankaya M. Examining the relationship between sustainability consciousness and physical activity in healthy young adults. *Ann Med Res.* 2025;32(8):355–361. doi: [10.5455/annalsmedres.2025.04.080](https://doi.org/10.5455/annalsmedres.2025.04.080).

## ■ ABSTRACT

**Aim:** Sustainability consciousness (SC) refers to the awareness and lived experience of sustainability phenomena, which includes personal insights and viewpoints. The objective of this study is to assess the correlation between SC and physical activity among young, healthy volunteers.

**Materials and Methods:** We assessed sustainability consciousness (SC) using the Sustainability Consciousness Questionnaire (SCQ) and physical activity levels with the International Physical Activity Short Form (IPAQ-sf).

**Results:** We included 235 participants in the study, with ages ranging from 18 to 33 years and an average BMI of 23.01. The study found no statistically significant association between overall physical activity levels (IPAQ-SF) and overall sustainability consciousness (SCQ) ( $p > .05$ ). Furthermore, none of the IPAQ-SF sub-parameters showed a significant correlation with the SCQ's total scores for knowledge ( $r = -.014$ ,  $p = .835$ ), attitude ( $r = -.007$ ,  $p = .912$ ), or behavior ( $r = .070$ ,  $p = .287$ ). When examining the SCQ sub-parameters, we found no significant association between knowledge (economic) and attitude (environment) ( $r = -.040$ ,  $p = .539$ ), or between knowledge (economic) and behavior (social) ( $r = -.047$ ,  $p = .472$ ). However, all other SCQ sub-parameters showed significant intercorrelations ( $p < .001$ ). Specifically, knowledge (social) and behavior (social) sub-parameters were not significantly related ( $r = .026$ ,  $p = .689$ ), but all other pairings within the SCQ sub-parameters were significantly correlated ( $p < .001$ ).

**Conclusion:** This study found no association between sustainability consciousness (SC) and physical activity in healthy young individuals. However, we did observe significant interrelationships among the knowledge, attitude, and behavior sub-parameters of the Sustainability Consciousness Questionnaire (SCQ), across economic, social, and environmental dimensions.

**Keywords:** Consciousness, Sustainability development, Healthy volunteers, Higher education, Sustainability knowledge

**Received:** Apr 17, 2025 **Accepted:** Jun 23, 2025 **Available Online:** Aug 25, 2025



Copyright © 2025 The author(s) - Available online at [annalsmedres.org](https://annalsmedres.org). This is an Open Access article distributed under the terms of Creative Commons Attribution-NonCommercial-NoDerivatives 4.0 International License.

## ■ INTRODUCTION

Sustainability is a multifaceted approach aiming to preserve natural resources for future generations [1]. It encompasses environmental, economic, and social dimensions, advocating for eco-friendly practices and striving for a fair standard of living that enhances social welfare. In our rapidly developing world, sustainability has become paramount, making the effective use of resources a fundamental necessity [2,3].

Sustainability consciousness (SC) is defined as an individual's experience and awareness of sustainability phenomena, including their personal perspectives [4]. This concept is often

linked to an individual's knowledge, attitudes, and behaviors across environmental, social, and economic contexts [5]. SC highlights sensitivity to environmental factors, problems, and themes. Individuals with a strong SC are expected to significantly influence the development of future societies and contribute to social progress [6].

It's crucial for individuals to align their lives with contemporary demands while remaining aware of age-specific requirements to ensure access to suitable education [7]. Active participation in social life, driven by SC, fosters social development within the sustainability framework [8]. Moreover, in-

dividuals engaged in social life with SC tend to develop heightened environmental sensitivity by being aware of their surroundings. This underscores the importance of individuals being conscious of and sensitive to environmental factors within the context of sustainability and quality education. Ultimately, environmentally aware and conscious societies are vital for achieving a sustainable understanding, aligning with the broader Sustainable Development Goals.

One key objective of the World Health Assembly Global Physical Activity (PA) Action Plan 2018-30 is to reduce physical inactivity by 10% by 2025 and by 15% by 2030 [9]. The World Health Assembly Guidelines on Physical Activity and Sedentary Behaviour recommend a weekly minimum of 150–300 minutes of moderate-intensity PA, 75–150 minutes of high-intensity PA, or an equivalent combination [10]. Lack of regular and adequate physical activity is a widespread global issue. Consequently, promoting lifestyles that incorporate regular exercise is a national and international public health recommendation. Positive health-related lifestyle changes adopted early in life are effective in reducing the incidence of lifestyle-related disorders, necessitating a comprehensive investigation into health behaviors among young individuals [11]. In Türkiye, healthy young people represent a dynamic and crucial demographic. This population is relatively homogeneous and accessible, and their physical activity levels are important for reducing the incidence of diseases that may cause problems later in life [12].

Many studies grounded in the theory of planned behavior have empirically demonstrated relationships between attitudes, perceived norms, intention, consciousness, and behavior. When adapted to information-sharing behavior, this theory links sharing behavior with subjective norms, personal attitudes, consciousness, and perceived behavioral control through the intention to share information. Building on this, our study specifically examines the relationship between SC and PA levels.

Currently, there are very few significant studies investigating PA levels within the Turkish population, and no existing research has explored the direct relationship between SC and PA levels. However, approaches to this topic suggest the importance of physical activity levels among individuals pursuing academic studies related to health and physical activity, particularly in higher education. Against this backdrop, the present study aims to evaluate the interaction between SC and PA in young, healthy participants.

## ■ MATERIALS AND METHODS

### *Study design*

This study used a descriptive methodological approach with a cross-sectional design. Ethical approval was obtained from the Necmettin Erbakan University Health Sciences Ethics Committee (2025/972, 12/2/2025). We also secured permissions from the Necmettin Erbakan University's Kamil

Akkanat Faculty of Health Sciences and Ahmet Cengiz Faculty of Engineering. All participants received both verbal and written information about the research and provided informed consent prior to data collection [13].

### *Participants*

We calculated the sample size using a power analysis in G\*Power 3.1.9.7. The study's treatment effect was defined as the difference between two treatments. Based on t-test calculations in G\*Power 3.1.9.2, with an effect size of 0.25, a standard error of 0.05, and 95% power, a point biserial correlation required 197 participants [14]. To account for potential missing data and enhance study power, we included 235 volunteers.

### *Methods*

#### *Participants and Data collection*

We identified participants who met the study's inclusion criteria as volunteers. Data were voluntarily collected through face-to-face interviews, adhering to the Declaration of Helsinki [13]. All participants provided written informed consent in accordance with human ethics regulations before data collection began.

Our eligibility criteria were based on previous studies. Inclusion criteria included:

- No health issues that would prevent physical activity.
- Willingness to participate in the research project.
- Literacy [13].

Exclusion criteria comprised:

- Musculoskeletal problems that could alter physical activity habits.
- Cardiac and respiratory problems.
- Diabetes mellitus.
- Chronic drug use.
- A body mass index (BMI) of 35 kg/m<sup>2</sup> or higher.
- Any other condition that might prevent physical activity [15].

### *Outcome measures*

We recorded participants' physical information (age, height, gender, BMI) and sociodemographic data (chronic diseases, medication use). Sustainability consciousness (SC) was assessed using the Sustainability Consciousness Questionnaire (SCQ). Physical activity levels were measured using the International Physical Activity Questionnaire–Short Form (IPAQ-SF). Participants completed these assessment scales on photocopied sheets.

### Sustainability Consciousness Questionnaire (SCQ)

The SCQ was developed by researchers, with contributions from Michalos et al. (2012) [16], and adapted into Turkish by Yüksek et al. (2019) [17]. It consists of 50 items across 3 subscales: Knowledge, Attitude, and Behavior. Each subscale integrates economic, social, and environmental factors. The questionnaire uses a five-point Likert scale ranging from "strongly agree" to "strongly disagree." The "don't know" option from the original scale was omitted to avoid confusion for the students [17].

The SCQ demonstrated strong psychometric properties: item-total correlations ranged from .300 to .819, and t-values from 2.237 to 18.812, indicating sufficient discrimination power for all items ( $p < .05$ ). The overall Cronbach's alpha coefficient for the scale was .860 [17].

### International Physical Activity Questionnaire–Short Form (IPAQ-SF)

The IPAQ-SF is a self-report questionnaire designed to assess an individual's physical activity level. Its validity and reliability have been established in 12 different countries [18]. The IPAQ-SF comprises seven questions that gather information on the duration and frequency of walking, moderate-intensity activities, and vigorous-intensity activities over the previous week.

Total physical activity scores are derived by calculating the mean duration (in minutes) and frequency of walking, moderate-to-vigorous activity, and vigorous activity. Energy expenditure is quantified using MET-minute scores, with standardized MET values assigned to activities (e.g., walking = 3.3 METs, moderate activity = 4.0 METs, vigorous exercise = 8.0 METs). These MET values are multiplied by the frequency in minutes and days to determine the overall physical activity score [18]. In addition to continuous scoring, the numerical data obtained are also classified into categories of physical activity. The processing of IPAQ-SF data follows an automated report and scoring methodology guidance. For the Turkish validity and reliability study, Cronbach's alpha values for the subscales ranged from .73 to .76 [19].

### Statistical analysis

We performed all statistical analyses using IBM SPSS Statistics for Windows Version 29.00 (Armonk, NY: IBM Corp.). Data accuracy and normality were rigorously verified. We used the Kolmogorov-Smirnov test, along with skewness and kurtosis tests, to assess data conformity to a normal distribution [20]. Descriptive statistics for measured values are presented as mean  $\pm$  standard deviation ( $X \pm SD$ ), while unmeasured values are reported as percentages (%) and numbers (n). Pearson correlation analysis was conducted to determine the relationship between IPAQ-SF and SCQ scores. Results were evaluated with a 95% confidence interval and a significance level set at  $p < 0.05$ , as previously outlined [21].

**Table 1.** Physical and sociodemographic characteristics of the participants (n=235).

| Physical characteristics         | M $\pm$ SD        | Min-Max       |
|----------------------------------|-------------------|---------------|
| Age (Year)                       | 21.32 $\pm$ 3.32  | 18.00-33.00   |
| Height (cm)                      | 170.55 $\pm$ 9.21 | 153.00-190.00 |
| Weight (kg)                      | 66.89 $\pm$ 10.73 | 50.00-103.00  |
| BMI (kg/m <sup>2</sup> )         | 23.01 $\pm$ 3.41  | 15.86-39.25   |
| Sociodemographic characteristics |                   | n (%)         |
| Chronic Disorders                | Yes               | 22 (9.4)      |
|                                  | No                | 213 (90.6)    |
| Drugs Used                       | Yes               | 21 (8.9)      |
|                                  | No                | 214 (91.1)    |

n: The number of participants. M: Mean. SD: Standard Deviation. Min: Minimum. Max: Maximum. BMI: Body Mass Index.

## RESULTS

Our study included 235 participants aged between 18 and 33 years, with an average Body Mass Index (BMI) of 23.01. Most participants reported no long-term health problems (90.6%) and were not taking any medication (91.1%) (Table 1).

The overall mean score for the Sustainability Consciousness Questionnaire (SCQ) was  $198.00 \pm 18.80$ . Sub-parameter mean scores were: Knowledge,  $77.31 \pm 10.37$ ; Attitude,  $56.20 \pm 7.22$ ; and Behavior,  $64.18 \pm 10.39$ . We found no statistically significant association between an individual's physical activity level (IPAQ-SF) and their overall sustainability consciousness (SCQ) ( $p > .05$ ) (Table 2).

As shown in Table 3, the total scores for knowledge, attitude, and behavior (across all SCQ sub-parameters) exhibited no significant correlation with each other ( $r = -.014$ ,  $p = .835$ ;  $r = -.007$ ,  $p = .912$ ;  $r = .070$ ,  $p = .287$ , respectively). When examining specific SCQ sub-parameters (Table 4), we found no significant relationship between knowledge (economic) and attitude (environment) ( $r = -.040$ ,  $p = .539$ ), nor between knowledge (economic) and behavior (social) ( $r = -.047$ ,  $p = .472$ ). Additionally, there was no significant relationship between knowledge (social) and behavior (social) ( $r = .026$ ,  $p = .689$ ). However, all other SCQ sub-parameters showed significant inter-correlations ( $p < .001$ ).

Our multiple regression analysis (Model 1) confirmed no significant relationship between the total scores of knowledge, attitude, behavior, and IPAQ-SF ( $F = 0.381$ ,  $p = 0.767$ ). This model had a multiple correlation coefficient of 0.07 (Table 5).

## DISCUSSION

This study represents a novel contribution to the existing literature, as it's the first to explore the direct relationship between sustainability consciousness (SC) and physical activity (PA) in healthy young individuals. Our findings indicate no statistically significant association between overall SC and PA levels in this demographic. However, we did observe significant interrelationships among the knowledge, attitude, and behavior sub-parameters of the Sustainability Consciousness

**Table 2.** Participants' Sustainability Consciousness Scale and International Physical Activity Questionnaire Short Form scores (n=235).

| SUS CONS sub-parameters |       | M±SD         | Min    | Max    | Skewness  |           | Kurtosis  |           |
|-------------------------|-------|--------------|--------|--------|-----------|-----------|-----------|-----------|
|                         |       |              |        |        | Statistic | Std.Error | Statistic | Std.Error |
| Knowledge               | ECO   | 20.88±3.42   | 2.00   | 25.00  | -1.07     | 0.16      | 3.08      | 0.32      |
|                         | SOC   | 37.02±6.20   | 18.00  | 55.00  | -0.90     | 0.16      | 1.35      | 0.32      |
|                         | ENV   | 19.41±3.50   | 2.00   | 35.00  | -0.25     | 0.16      | 3.27      | 0.32      |
|                         | Total | 77.31±10.37  | 42.00  | 95.00  | -0.69     | 0.16      | 0.78      | 0.32      |
| Attitude                | ECO   | 17.51±2.89   | 12.00  | 40.00  | 1.90      | 0.16      | 14.79     | 0.32      |
|                         | SOC   | 24.65±4.74   | 12.0   | 32.00  | -0.59     | 0.16      | -0.55     | 0.32      |
|                         | ENV   | 14.05±3.15   | 8.00   | 30.00  | 1.33      | 0.16      | 3.10      | 0.32      |
|                         | Total | 56.20±7.22   | 38.00  | 86.00  | 0.26      | 0.16      | 0.57      | 0.32      |
| Behavior                | ECO   | 14.51±3.15   | 7.00   | 24.00  | -0.01     | 0.16      | -0.27     | 0.32      |
|                         | SOC   | 22.61±4.10   | 1.00   | 30.00  | 4.10      | 0.16      | 3.11      | 0.32      |
|                         | ENV   | 27.00±5.85   | 11.00  | 36.00  | -0.14     | 0.16      | -0.79     | 0.32      |
|                         | Total | 64.18±10.39  | 38.00  | 85.00  | -0.19     | 0.16      | -0.60     | 0.32      |
| SUS CONS General Total  |       | 198.00±18.80 | 142.00 | 306.00 | 0.82      | 0.16      | 4.49      | 0.32      |
| IPAQ-SF                 |       | 3999.19±1003 | 1500   | 6000   | 0.02      | 0.16      | -0.78     | 0.32      |

n: The number of participants. M: Mean. SD: Standard Deviation. Min: Minimum. Max: Maximum, SUS CONS: Sustainability Consciousness, ECO: Economic, SOC: Social; ENV: Environmental, IPAQ-SF: International Physical Activity Questionnaire Short Form.

**Table 3.** Determining the relationship between the participants' Sustainability Consciousness Scale and International Physical Activity Questionnaire Short Form scores using Pearson correlation

| SUS CONS sub-parameters |       | International Physical Activity Questionnaire Short Form |       |                          |       |
|-------------------------|-------|----------------------------------------------------------|-------|--------------------------|-------|
|                         |       | r                                                        | p     | 95% Confidence Intervals |       |
|                         |       |                                                          |       | Lower                    | Upper |
| Knowledge               | ECO   | -0.004                                                   | 0.950 | 0.950                    | 0.124 |
|                         | SOC   | -0.010                                                   | 0.873 | 0.873                    | 0.118 |
|                         | ENV   | -0.018                                                   | 0.785 | 0.785                    | 0.110 |
|                         | Total | -0.014                                                   | 0.835 | 0.835                    | 0.115 |
| Attitude                | ECO   | -0.045                                                   | 0.496 | 0.496                    | 0.084 |
|                         | SOC   | -0.053                                                   | 0.416 | 0.416                    | 0.075 |
|                         | ENV   | 0.105                                                    | 0.110 | 0.110                    | 0.229 |
|                         | Total | -0.007                                                   | 0.912 | 0.912                    | 0.121 |
| Behavior                | ECO   | 0.108                                                    | 0.099 | 0.099                    | 0.233 |
|                         | SOC   | -0.023                                                   | 0.725 | 0.725                    | 0.105 |
|                         | ENV   | 0.082                                                    | 0.211 | 0.211                    | 0.207 |
|                         | Total | 0.070                                                    | 0.287 | 0.287                    | 0.196 |
| SUS CONS General Total  |       | 0.007                                                    | 0.921 | 0.921                    | 0.134 |

n: The number of participants. SUS CONS: Sustainability Consciousness, ECO: Economic, SOC: Social; ENV: Environmental, p <0.05. r: Pearson correlation coefficient. \*\*= Correlation is significant at the 0.001 level. \*= Correlation is significant at the 0.05 level.

Questionnaire (SCQ), across economic, social, and environmental dimensions.

While our study found no direct link between overall SC and PA, it's important to compare this with the closest related research. Polat et al. (2019) reported that individuals engaged in PA, whether licensed or recreational, exhibited more positive sustainable consumption behaviors than inactive individuals [22]. Similarly, Niu et al. (2024) demonstrated that leisure time and physical activity significantly influence the intention to make green/sustainable purchases, showing a positive correlation between participation in leisure-time PA and the purchase of environmentally friendly and sustainable products

[23]. Furthermore, Erarslan et al. (2024) identified a moderate positive relationship between SC and environmental behaviors [24], and Opdenacker et al. (2008) noted a positive psychological effect of sustainability lifestyle physical activity interventions on rural women [25]. Pan et al. (2024) even showed that teachers' lesson management can enhance students' metacognition, contributing to the development of SC [26].

The absence of a direct relationship between SC and PA in our study might be attributed to our participant demographic, specifically healthy young adults. We hypothesize that results could differ across other age groups. Despite this, physical ac-

**Table 4.** Determining the relationship between the participants' Sustainability Consciousness Scale scores using Pearson correlation.

| SUS CONS sub-parameters |       | Knowledge |        |          |        |         |        |          |        |
|-------------------------|-------|-----------|--------|----------|--------|---------|--------|----------|--------|
|                         |       | ECO       |        | SOC      |        | ENV     |        | Total    |        |
|                         |       | r         | p      | r        | p      | r       | p      | r        | p      |
| Knowledge               | ECO   | 1         |        |          |        |         |        |          |        |
|                         | SOC   | 0.530**   | <0.001 | 1        |        |         |        |          |        |
|                         | ENV   | 0.252**   | <0.001 | 0.375**  | <0.001 | 1       |        |          |        |
|                         | Total | 0.733**   | <0.001 | 0.901**  | <0.001 | 0.646** | <0.001 | 1        |        |
| Attitude                | ECO   | 0.323**   | <0.001 | 0.253**  | <0.001 | 0.120   | 0.067  | 0.298**  | <0.001 |
|                         | SOC   | 0.522**   | <0.001 | 0.447**  | <0.001 | 0.243** | <0.001 | 0.523**  | <0.001 |
|                         | ENV   | -0.040    | 0.539  | -0.105** | <0.001 | 0.025   | 0.708  | -0.068   | 0.300  |
|                         | Total | 0.454**   | <0.001 | 0.349**  | <0.001 | 0.218** | <0.001 | 0.433**  | <0.001 |
| Behavior                | ECO   | -0.135*   | 0.039  | -0.166** | 0.011  | -0.066  | 0.316  | -0.166*  | 0.011  |
|                         | SOC   | -0.047    | 0.472  | 0.026    | 0.689  | 0.163*  | 0.012  | 0.055    | 0.399  |
|                         | ENV   | -0.235**  | <0.001 | -0.189** | 0.004  | 0.054   | 0.408  | -0.173** | 0.008  |
|                         | Total | -0.192**  | 0.003  | -0.146** | 0.025  | 0.075   | 0.252  | -0.126   | 0.054  |
| SUS CONS Genberal Total |       | 0.490**   | <0.001 | 0.557**  | <0.001 | 0.433** | <0.001 | 0.646**  | <0.001 |

n: The number of participants. SUS CONS: Sustainability Consciousness, ECO: Economic, SOC: Social; ENV: Environmental, p <0.05. r: Pearson correlation coefficient. \*\*= Correlation is significant at the 0.001 level, \*= Correlation is significant at the 0.05 level.

**Table 5.** Determining the effects of sustainability awareness (Economic, Social, Environmental) on the International Physical Activity Questionnaire Short Form using multiple regression analysis.

| Multiple Regression Analysis                  |       |          |                   |                            |               | ANOVA |       |
|-----------------------------------------------|-------|----------|-------------------|----------------------------|---------------|-------|-------|
| Model Summary                                 |       |          |                   |                            |               |       |       |
| N=235                                         | R     | R Square | Adjusted R Square | Std. Error of the Estimate | Durbin-Watson | F     | p     |
| Model 1<br>SUS CONS (ECO, SOC, ENV)- IPAQ-Sf) | 0.070 | 0.005    | -0.008            | 1007.69                    | 1.352         | 0.381 | 0.767 |

N: The number of participants, SUS CONS: Sustainability Consciousness, ECO: Economic, SOC: Social; ENV: Environmental, IPAQ-Sf: International Physical Activity Questionnaire Short Form.

tivity plays a crucial role in reducing carbon footprint, promoting healthy living and healthcare systems, and enhancing nature interaction and awareness. We believe that SC is vital for active participation in such sustainability-focused endeavors.

Consistency in SCQ Scores

Our study’s overall mean SCQ score was 198.00 ± 18.80. The mean scores for SCQ sub-parameters were: Knowledge (77.31 ± 10.37), Attitude (56.20 ± 7.22), and Behavior (64.18 ± 10.39). These scores are comparable to those reported by Eraslan et al. (2024), who found overall mean SCQ scores of 194.52 ± 27.22 for females and 183.52 ± 30.56 for males. Their sub-parameter means were: Knowledge (77.64 ± 10.37 for females, 74.08 ± 14.90 for males), Attitude (56.62 ± 8.82 for females, 53.79 ± 9.65 for males), and Behavior (60.25 ± 10.23 for females, 55.63 ± 10.73 for males) [24]. Similarly, Tural et al. (2023) reported a general mean SCQ score of 189.65 ± 21.01, with sub-parameter means of Knowledge (73.59 ± 7.47), Attitude (58.47 ± 5.85), and Behavior (57.59 ± 7.69) [2]. The consistency of our SCQ sub-parameters and overall mean scores with these prior studies (Erslan et al. and Tural et al.) reinforces the reliability of our measurements [2,24].

Our findings confirm a significant relationship among the SCQ sub-parameters of knowledge, attitude, and behavior across economic, social, and environmental contexts. This aligns with Tural et al.’s (2023) research, which also found a significant connection between different components of SC (p<.05) [2]. Likewise, Salem et al. (2021) and Ovais et al. (2023) reported significant relationships between the various parts of SCQ and students’ SC in their respective studies (p<.05) [27,28]. The consistency of our results with these studies further supports the interconnected nature of SC’s sub-parameters [2, 27, 28].

Limitations

To minimize bias in outcome measurements, we implemented blinding during data coding and reporting. The study utilized data collection tools with established validity and reliability. Data were meticulously collected by an expert, an Assistant Professor, and clear criteria were defined for participant exclusion and withdrawal. Appropriate statistical methods were employed for data analysis, including calculations of effect sizes and confidence intervals.

However, our study has several limitations. It was single-center research, involving students solely from a single univer-

sity in Konya province and specifically from certain departments, not an equal number from each. The evaluation of physical activity level was general rather than detailed. Furthermore, the reliance on self-report scales means that participants' accurate understanding of questions and attentive completion were crucial. One of the most important limitations of our study was the lack of data from the patient files evaluating long-term upper extremity motor functions. We believe that there is a need for new prospective randomized controlled studies on long-term upper extremity motor functions of patients who have undergone shoulder surgery and who have undergone ISBPB for postoperative pain control.

## ■ CONCLUSION

This study determined that there is no relationship between sustainability consciousness (SC) and physical activity levels in healthy young individuals. However, we confirmed that the knowledge, attitude, and behavior sub-parameters of the Sustainability Consciousness Questionnaire (SCQ) demonstrate significant interrelationships across economic, social, and environmental dimensions.

**Ethics Committee Approval:** Ethical permission was obtained from Necmettin Erbakan University Health Sciences Scientific Research Ethics Committee (Decision No: 2025/972, 12/2/2025).

**Informed Consent:** Informed consent was obtained from the participants.

**Peer-review:** Externally peer-reviewed.

**Conflict of Interest:** All authors have disclosed no conflicts of interest.

**Author Contributions:** F.N.T: Conception, Design, Supervision, Materials; M.Ç: Data Collection and/or Processing, Analysis and/or Interpretation, Literature Review, Writing, Critical Review.

**Financial Disclosure:** No financial support was received from any institution or person related to the study.

## ■ REFERENCES

1. Emina KA. Sustainability development and the future generations. *Soc Sci Humanit Educ J*. 2021;2(1):57-71. <http://dx.doi.org/10.25273/she.v2i1.8611>.
2. Tural A, Turan H. The Relationship Between Sustainability Consciousness and Environmental Awareness Sensitivity Level in the Context of Sustainability Development. *Anadolu Uni J Educ Fac*. 2024;8(2):686-703. <http://dx.doi.org/10.34056/aujef.1402833>.
3. Grund J, Singer-Brodowski M & Büssing AG. Emotions and transformative learning for sustainability: a systematic review. *Sustain Sci*. 2024;19(1):307-324. <https://doi.org/10.1007/s11625-023-01439-5>.
4. Pan L & Chang YC. The Influence of Higher Vocational College Teachers' Course Management and Students' Metacognition on Students' Sustainability Consciousness. *Eur J Educ*. 2025;60(1):e12897. <https://doi.org/10.5897/ERR2023.4341>.
5. Ogishima H, Ito A, Kajimura S, et al. Validity and reliability of the Japanese version of the sustainability consciousness questionnaire. *Front Psychol*. 2023;14:1130550. <https://doi.org/10.3389/fpsyg>.
6. Nasibulina A. Education for Sustainability development and environmental ethics. *Procedia Soc Behav Sci*. 2015;214:1077-1082. <https://doi.org/10.1016/j.sbspro.2015.11.708>.
7. Bayram FÖ & Çengelci Köse T. Analyzing social studies textbooks in terms of sustainability awareness. *Anadolu Uni J Educ Fac*. 2023;7(3):500-531. <https://doi.org/10.34056/aujef.1201038>.
8. Singer-Brodowski M. The potential of transformative learning for sustainability transitions: moving beyond formal learning environments. *Environ Dev Sustain*. 2023;1-19. <https://doi.org/10.1007/s10668-022-02444-x>.
9. Denche-Zamorano Á, Mendoza-Muñoz M, Carlos-Vivas J, et al. A Cross-Sectional Study on Self-Perceived Health and Physical Activity Level in the Spanish Population. *Int J Environ Res Public Health*. 2022;19(9):5656. <https://doi.org/10.3390/ijerph19095656>.
10. Dempsey PC, Friedenreich CM, Leitzmann MF, et al. Global Public Health Guidelines on Physical Activity and Sedentary Behavior for People Living With Chronic Conditions: A Call to Action. *J Phys Act Health*. 2021;18(1):76-85. <https://doi.org/10.1123/jpah.2020-0525>.
11. Lee IM, Shiroma EJ, Lobelo F, et al. Physical Activity Series Working Group. Effect of physical inactivity on major non-communicable diseases worldwide: an analysis of burden of disease and life expectancy. *Lancet*. 2012;380:219–29. [https://doi.org/10.1016/S0140-6736\(12\)61031-9](https://doi.org/10.1016/S0140-6736(12)61031-9).
12. Tandon PS, Kroshus E, Olsen K, et al. Socioeconomic Inequities in Youth Participation in Physical Activity and Sports. *Int J Environ Res Public Health*. 2021;18(13):6946. <https://doi.org/10.3390/ijerph18136946>.
13. Han JW, Park J, Lee H. Analysis of the effect of an artificial intelligence chatbot educational program on non-face-to-face classes: a quasi-experimental study. *BMC Med Educ*. 2022;22(1):830. <https://doi.org/10.1186/s12909-022-03898-3>.
14. Kang H. Sample size determination and power analysis using the G\*Power software. *J Educ Eval Health Prof*. 2021;18:17. <https://doi.org/10.3352/jeehp.2021.18.17>.
15. Araban M, Jafarpour K, Arasto, AA, et al. The Impact of a Theory-Based Education on Physical Activity among 'Health Volunteers': A Randomized Controlled Trial. *Health Educ Health Promot*. 2021;9(1):11-18.
16. Michalos AC, Creech H, Swayze N, et al. Measuring knowledge, attitudes and behaviors concerning Sustainability development among tenth-grade students in Manitoba. *Soc Indic Res*. 2012;106(2):2013–38. <https://doi.org/10.1007/s11205-011-9809-6>.
17. Yüksel Y, & Yıldız, B. Adaptation of the Sustainability consciousness scale to Turkish. *Erciyes J Educ*. 2019;3(1):16-36. <https://doi.org/10.32433/eje.562622>.
18. Dharmansyah D & Budiana D. Indonesian adaptation of the international physical activity questionnaire (IPAQ): Psychometric properties. *JPKI*. 2021;7(2):159-163. <http://dx.doi.org/10.17509/jpki.v7i2.39351>.
19. Sağlam M, Arikan H, Savci S, et al. International physical activity questionnaire: reliability and validity of the Turkish version. *Percept Mot Skills*. 2010;111(1): 278-284. <https://doi.org/10.2466/06.08.PMS.111.4.278>.
20. Mishra P, Pandey CM, Singh U, et al. Descriptive statistics and normality tests for statistical data. *Ann Card Anaesth*. 2019;22(1):67-72. [https://doi.org/10.4103/aca.ACA\\_157\\_18](https://doi.org/10.4103/aca.ACA_157_18).
21. Fethney J. Statistical and clinical significance, and how to use confidence intervals to help interpret both. *Aust Crit Care*. 2010;23(2):93-7. <https://doi.org/10.1016/j.aucc.2010.03.001>.
22. Polat E, Akoğlu HE, Konak O, et al. Investigation of Sustainability consumption behaviors in individuals who do and don't do physical activity. *Spormetre*. 2019;17(2):53-63. <https://doi.org/10.33689/spormetre.525753>.
23. Niu HJ, Huang KS, Huang PY, et al. Leisure-Time Physical Activity as a Pathway to Sustainability Living: Insights on Health, Environment, and Green Consumerism. *Int J Environ Res Public Health*. 2024;21(5):618. <https://doi.org/10.3390/ijerph21050618>.

24. Eraslan M, KIR S, Turan MB, Iqbal M. Sustainability Consciousness and Environmental Behaviors: Examining Demographic Differences Among Sports Science Students. *Sustainability*. 2024;16(24):10917. <https://doi.org/10.3390/su162410917>.
25. Opdenacker J, Boen, F, De Bourdeaudhuij I, et al. Explaining the psychological effects of a Sustainability lifestyle physical activity intervention among rural women. *Ment Health Phys Act*. 2008;1(2):74-81. <https://doi.org/10.1016/j.mhpa.2008.09.003>.
26. Pan L & Chang YC. (2025). The Influence of Higher Vocational College Teachers' Course Management and Students' Metacognition on Students' Sustainability Consciousness. *Eur J Educ*. 2025;60(1):e12897. <https://doi.org/10.1111/ejed.12897>.
27. Saleem A, Aslam S, Sang G, et al. Education for sustainable development and sustainability consciousness: evidence from Malaysian universities. *Int J Sustain High Educ*. 2023;24(1):193-211. <https://doi.org/10.1108/IJSHE-05-2021-0198>.
28. Ovais D. Students' sustainability consciousness with the three dimensions of sustainability: Does the locus of control play a role? *Reg Sustain*. 2023;4(1):13-27. <https://doi.org/10.1016/j.regsus.2023.02.002>.