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The Indirect Association Between Nutrition Knowledge and Healthy Lifestyle Awareness Through Body Appreciation Among Female University Students Residing in Dormitories

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Abstract

Objective

This study aimed to examine the associations among nutrition knowledge, body appreciation, and healthy lifestyle awareness and to determine whether body appreciation statistically accounts for part of the association between nutrition knowledge and healthy lifestyle awareness among female university students residing in dormitories.

Methods

This cross-sectional, correlational study included 392 female university students residing in university dormitories in the provinces of Elazığ and Tunceli during the 2025–2026 academic year. Data were collected using the Personal Information Form, the Nutrition Knowledge Scale, the Body Appreciation Scale-2, and the Healthy Lifestyle Awareness Scale. Descriptive statistics, independent-samples t-tests, one-way analysis of variance (ANOVA), Pearson correlation analysis, multiple linear regression analysis, and Hayes' PROCESS Macro Model 4 were used for data analysis. The indirect association was evaluated using 5,000 bootstrap resamples.

Results

Significant positive correlations were found between nutrition knowledge and body appreciation ($r = 0.125$, $p = 0.013$), nutrition knowledge and healthy lifestyle awareness ($r = 0.242$, $p < 0.001$), and body appreciation and healthy lifestyle awareness ($r = 0.307$, $p < 0.001$). Multiple linear regression analysis indicated that both nutrition knowledge ($\beta = 0.207$, $p < 0.001$) and body appreciation ($\beta = 0.281$, $p < 0.001$) were positively associated with healthy lifestyle awareness, explaining 13.6% of the variance ($R^2 = 0.136$). The bootstrapped indirect-effect analysis indicated a statistically significant indirect association between nutrition knowledge and healthy lifestyle awareness through body appreciation (effect = 0.020, 95% CI = 0.001–0.041).

Conclusion

Nutrition knowledge, body appreciation, and healthy lifestyle awareness were positively associated with one another, and a statistically significant indirect association between nutrition knowledge and healthy lifestyle awareness through body appreciation was observed. However, given the cross-sectional design, these findings should not be interpreted as evidence of causal relationships or a causal mediation mechanism.

Introduction

The university years represent a critical developmental period during which lifestyle habits are established and the foundations of healthy behaviors in adulthood are formed (Buková et al., 2024; Lonati, 2024). During this period, students experience major life changes, including leaving their families to live independently, coping with increasing academic responsibilities, managing limited financial resources, and adapting to new social environments (Bennasar-Veny et al., 2020; Moscatelli et al., 2023). Students living in university dormitories or away from their families are particularly vulnerable to various health risk factors, including irregular eating habits, insufficient physical activity, and sleep disturbances (Maillet et al., 2021; Zaheer et al., 2023). Recent evidence suggests that unhealthy lifestyle behaviors frequently cluster among university students, and when combined with academic stress, may increase the long-term risk of chronic diseases (Müller et al., 2022; Zheng et al., 2025). In addition, individuals' perceptions of their own bodies (body appreciation) and their nutrition literacy (nutrition knowledge), which enables them to manage these perceptions, play a crucial role in the adoption of healthy lifestyle behaviors (Alothman et al., 2024; Çol et al., 2024). Understanding the associations among body appreciation, nutrition knowledge, and healthy lifestyle behaviors is particularly important for addressing the environmental and individual challenges encountered by students living in dormitories. In this context, universities should be regarded not only as educational institutions but also as public health settings that promote healthy lifestyles, providing an essential foundation for the development of comprehensive campus-based health promotion interventions (Aceijas et al., 2017; Almutairi et al., 2018).

Healthy lifestyle awareness refers to an individual's awareness of the knowledge, attitudes, and behaviors required to maintain and improve health. Adopting healthy behaviors—including balanced nutrition, regular physical activity, adequate sleep, effective stress management, and avoidance of harmful habits—is fundamental to preventing chronic diseases and improving quality of life (Lonati et al., 2024). Among university students, high levels of healthy lifestyle awareness not only contribute to current health status but also establish the foundation for maintaining healthy behaviors throughout adulthood (Müller et al., 2022). However, previous studies have shown that many university students fail to consistently practice healthy lifestyle behaviors because of academic pressure, financial constraints, and the challenges associated with independent living (Almoraie et al., 2025; Buková et al., 2024).

One of the most important psychosocial determinants of healthy lifestyle behaviors is body appreciation. Body appreciation encompasses individuals' thoughts, feelings, and evaluations regarding their own bodies and is considered an important determinant of both physical and psychological well-being (Zheng et al., 2025). Previous research has demonstrated that individuals with more positive body appreciation are more likely to adopt healthier dietary habits and engage in higher levels of physical activity (Bednarzyk et al., 2013; Thomas et al., 2020). Conversely, negative body appreciation has been directly associated with unhealthy dieting behaviors, lower self-esteem, and disordered eating (Hao et al., 2023; Ruiz-Bravo et al., 2025). Among university-aged individuals, media exposure, social interactions, and societal beauty ideals are known to be associated with body appreciation, which is also related to healthy lifestyle decisions (Gadaga et al., 2025; Karam et al., 2023).

Another critical factor in this behavioral process is nutrition knowledge. Individuals' knowledge regarding nutrients, balanced dietary principles, and food selection enhances their capacity to make healthier dietary choices (Almoraie et al., 2024). Students with higher levels of nutrition knowledge are generally more likely to adhere to dietary recommendations and reduce their risk of chronic diseases (Çol et al., 2024). Nevertheless, theoretical knowledge alone does not necessarily translate into behavioral change. Psychological characteristics, body appreciation, and social support mechanisms may help explain the association between nutrition knowledge and healthy lifestyle behaviors (Moscatelli et al., 2023; Sousa et al., 2022). Therefore, healthy lifestyle awareness among university students may reflect not only nutrition knowledge but also its association with positive body appreciation and a campus environment that facilitates healthy choices (Korn, 2013; Zhang et al., 2024).

Although numerous studies have independently examined the relationships among nutrition knowledge, body appreciation, and healthy lifestyle behaviors, relatively few have investigated these variables within a comprehensive conceptual framework. In particular, research examining whether body appreciation statistically accounts for part of the association between nutrition knowledge and healthy lifestyle awareness remains limited. Furthermore, studies focusing specifically on female university students residing in dormitories—a population whose opportunities for healthy eating and physical activity may be constrained by their living conditions—are scarce. Therefore, the present study aimed to examine the association between nutrition knowledge and healthy lifestyle awareness and to determine whether body appreciation statistically accounts for part of this association among female university students living in university dormitories. The findings are expected to contribute to the planning of nutrition education and health promotion programs for university students while providing further evidence regarding the association of body appreciation with healthy lifestyle awareness.

Hypotheses

H1. Nutrition knowledge is positively associated with body appreciation.

H2. Nutrition knowledge is positively associated with healthy lifestyle awareness.

H3. Body appreciation is positively associated with healthy lifestyle awareness.

Methods

Study Design

This study employed a cross-sectional, descriptive, and correlational research design to examine the associations among nutrition knowledge, body appreciation, and healthy lifestyle awareness among female university students residing in dormitories. The study was conducted during the 2025–2026 academic year in university dormitories located in the provinces of Elazığ and Tunceli, Türkiye. The research was carried out in accordance with the ethical principles of the Declaration of Helsinki, and written informed consent was obtained from all participants prior to data collection (World Medical Association, 2013).

Participants

The study population consisted of female university students residing in university dormitories in the provinces of Elazığ and Tunceli during the 2025–2026 academic year. A convenience sampling method, one of the non-probability sampling techniques, was employed to recruit participants (Etikan et al., 2016). A total of 425 questionnaires were initially collected. During the data-cleaning process, 33 questionnaires were excluded because they contained missing data, were completed incorrectly, or included inconsistent response patterns that could potentially affect the reliability of the analyses. Consequently, the final analyses were conducted using data obtained from 392 participants.

The inclusion criteria were as follows: (a) being a university student, (b) residing in a university dormitory, (c) being female, (d) being at least 18 years of age, and (e) voluntarily agreeing to participate in the study. Exclusion criteria included incomplete or incorrectly completed questionnaires, substantial missing responses on the measurement scales, and inconsistent response patterns that could compromise the reliability of the analyses.

Table 1. Sociodemographic Characteristics of the Participants

Variable		n	%
Educational Program	Faculty	267	68,1%
	Vocational School	125	31,9%
Perceived Economic Status	Low	79	20,2%
	Moderate	268	68,4%
	High	45	11,5%
Regular Exercise	Yes	75	19,1%
	No	152	38,8%
	Partly	165	42,1%
Received Nutrition Education	Yes	101	25,8%
	No	291	74,2%
Dieting Status	Yes	57	14,5%
	No	335	85,5%
Meal-Skipping Habit	Regular meals	79	20.2%
	Occasionally skip meals	188	48.0%
	Frequently skip meals	125	31.9%
Daily Social Media Use	≤1 hour	19	4,8%
	2 hours	52	13,3%
	3 hours	75	19,1%
	4 hours	94	24,0%
	5 hours	33	8,4%
	6 hours	83	21,2%
	≥7 hours	36	9,2%
Variable		Ortalama±SS	Alt-Üst Değer
Age (years)		21,61±2,05	18-34
Height (cm)		165,71±7,03	150-188
Body weight (kg)		59,23±7,58	41-84
Body Mass Index (kg / boy²)		21,56±2,42	15,43-30,12

Table 1 shows that the mean age of the 392 female university students residing in dormitories was 21.61 ± 2.05 years. Their mean height, body weight, and body mass index (BMI) were 165.71 ± 7.03 cm, 59.23 ± 7.58 kg, and 21.56 ± 2.42 kg/m², respectively. Most participants were enrolled in a faculty program (68.1%), while 31.9% attended a vocational school. The majority (68.4%) perceived their economic status as moderate. Additionally, 42.1% reported engaging in regular exercise partially, 74.2% had not previously received nutrition education, and 85.5% reported that they were not following any diet.

Data Collection Procedure

The data were collected during the 2025–2026 academic year through face-to-face questionnaire administration in university dormitories located in the provinces of Elazığ and Tunceli, Türkiye. Before data collection, participants were informed in detail about the purpose, scope, and procedures of the study. Participation was entirely voluntary, and written informed consent was obtained from all students who agreed to participate. The questionnaires were administered by the researchers, and participants completed them independently without any guidance or intervention. Participants were informed that they could withdraw from the study at any stage without any consequences. Completing the questionnaire required approximately 10–15 minutes. No personally identifiable information was collected. All data were anonymized and used solely for scientific research purposes. After data collection, the questionnaires were screened for missing values, incorrect completion, and inconsistent response patterns. Based on these quality-control procedures, 33 questionnaires were excluded, and the final analyses were conducted using data from 392 participants.

Data Collection Instruments

Data were collected using a Personal Information Form, the Nutrition Knowledge Scale, the Body Appreciation Scale-2 (BAS-2), and the Healthy Lifestyle Awareness Scale. These instruments were used to assess participants' sociodemographic characteristics, nutrition knowledge, body appreciation, and

healthy lifestyle awareness. All measurement instruments had previously demonstrated acceptable validity and reliability and had been validated for use in Turkish populations.

Personal Information Form

The Personal Information Form was developed by the researchers based on the relevant literature and consisted of 12 items designed to obtain participants' sociodemographic and lifestyle characteristics. The questionnaire included items regarding age, height, body weight, body mass index (BMI), regular exercise status, educational program, perceived economic status, previous nutrition education, dieting status, meal-skipping habits, and daily social media use. BMI (kg/m²) was calculated using participants' self-reported height and weight according to the World Health Organization formula:

BMI = body weight (kg) / height² (m²) (WHO, 2000).

Nutrition Knowledge Scale

Participants' nutrition knowledge was assessed using the Nutrition Knowledge Scale (NKS) developed by Öngün Yılmaz et al. (2021). The scale consists of 31 items designed to evaluate nutrition knowledge among healthy adults. Items are rated on a 5-point Likert scale ranging from 0 (Strongly disagree) to 4 (Strongly agree). Items 1, 5, 6, 9, 10, 16, 17, 21, 27, and 28 are reverse scored. Total scores range from 0 to 124, with higher scores indicating greater nutrition knowledge. The original study reported a Cronbach's alpha coefficient of 0.851 (Öngün Yılmaz et al., 2021), whereas the internal consistency coefficient in the present study was 0.878.

Body Appreciation Scale

Body appreciation was assessed using the Body Appreciation Scale-2 (BAS-2) developed by Tylka and Wood-Barcalow (2015). The Turkish validity and reliability study was conducted by Anlı et al. (2015). The BAS-2 contains 10 items rated on a 5-point Likert scale ranging from 1 (Never) to 5 (Always). Total scores range from 10 to 50, with higher scores indicating a more positive body appreciation. The Turkish validation study reported a Cronbach's alpha coefficient of 0.88 (Anlı et al., 2015). In the present study, Cronbach's alpha was 0.921.

Healthy Lifestyle Awareness Scale

Healthy lifestyle awareness was assessed using the Healthy Lifestyle Awareness Scale (HLAS) developed by Özer and Yılmaz (2020). The scale comprises 15 items organized into four dimensions: change, socialization, responsibility, and nutrition. Responses are recorded on a 5-point Likert scale, yielding total scores ranging from 15 to 75, with higher scores indicating greater healthy lifestyle awareness. The original developers reported a Cronbach's alpha coefficient of 0.81 (Özer & Yılmaz, 2020). In the present study, Cronbach's alpha was 0.872.

Ethical Approval

This study received ethical approval from the Siirt University Ethics Committee (Approval No.: 1644, Date: 02.07.2026). The study was conducted in accordance with the ethical principles of the Declaration of Helsinki (World Medical Association, 2013). Permission to conduct the study was obtained from the relevant institutional authorities before data collection commenced. All participants were informed about the purpose, scope, and voluntary nature of the study, and written informed consent was obtained prior to participation. No identifying information was collected, and all data were analyzed anonymously and used exclusively for scientific research purposes.

Statistical Analysis

Data were analyzed using IBM SPSS Statistics version 31.0 and Hayes' PROCESS Macro version 4.2 (Hayes, 2022). Before the analyses, the dataset was examined for missing values, outliers, and compliance with statistical assumptions. Continuous variables are presented as mean ± standard deviation (SD), whereas categorical variables are reported as frequencies and percentages. The internal consistency of the measurement instruments was assessed using Cronbach's alpha coefficients. Independent-samples t-tests were used to compare two groups, whereas one-way analysis of variance (ANOVA) was employed for comparisons involving more than two groups. When ANOVA indicated significant differences, Tukey's honestly significant difference (HSD) post hoc test was performed to identify pairwise group differences. Effect sizes for group comparisons were calculated using eta squared (η^2) and interpreted according to Cohen's (1988) guidelines, where 0.01, 0.06, and 0.14 represent small, medium, and large effects, respectively. Pearson correlation analysis was conducted to examine the relationships among the study variables. Multiple linear regression analysis was performed to identify predictors of healthy lifestyle awareness. Regression assumptions were evaluated using tolerance values, variance inflation factors (VIFs), and the Durbin–Watson statistic. A bootstrapped indirect-effect analysis was conducted using PROCESS Macro Model 4 (Hayes, 2022) to examine whether body appreciation statistically accounted for part of the association between nutrition knowledge and healthy lifestyle awareness. Age, body mass index (BMI), regular exercise status, nutrition education status, and perceived economic status were included as covariates. The significance of the indirect association was assessed using 5,000 bootstrap resamples and 95% bootstrap confidence intervals (CIs). An indirect effect was considered statistically significant when the confidence interval did not include zero. Statistical significance was established at $p < 0.05$ for all analyses. To describe the statistical power associated with the obtained sample size, a post hoc power analysis was performed using G*Power version 3.1.9.7 (Faul et al., 2009). Based on a multiple linear regression model with a medium effect size ($f^2 = 0.15$), a significance level of $\alpha = 0.05$, and the obtained sample size ($n = 392$), the achieved statistical power exceeded 0.99 (99%). This analysis indicated that the available sample size provided adequate statistical power for the specified multiple regression model.

Results

Table 2. Descriptive Statistics and Reliability Coefficients of the Measurement Scales

Scale	Number of Items	Min	Max	Mean ± SD	Cronbach's α
Nutrition Knowledge Scale	31	44	124	80.37 ± 16.31	0.878
Body Appreciation Scale	10	10	50	42.61 ± 7.47	0.921
Healthy Lifestyle Awareness Scale	15	28	75	56.38 ± 9.94	0.872

As shown in Table 2, the participants' mean scores were 80.37 ± 16.31 for the Nutrition Knowledge Scale, 42.61 ± 7.47 for the Body Appreciation Scale, and 56.38 ± 9.94 for the Healthy Lifestyle Awareness Scale. Examination of the internal consistency coefficients indicated that Cronbach's alpha values ranged from 0.872 to 0.921, demonstrating that all measurement instruments possessed good to excellent internal reliability.

Table 3. Comparison of Nutrition Knowledge, Body Appreciation, and Healthy Lifestyle Awareness Scores According to Participant Characteristics

Variable	Group	n	Nutrition Knowledge (Mean ± SD)	p	Body Appreciation (Mean ± SD)	p	Healthy Lifestyle Awareness (Mean ± SD)	p
Educational Program	Facultya	267	81.51±17.04	**<0.043**	41.84±7.99	**0.001**	56.52±10.39	0.667
	Vocational School	125	77.93±14.32		44.27±5.91		56.08±8.94	
Received Nutrition Education	Yes	101	82.41±15.70	0.145	42.59±8.06	0.971	56.60±9.63	0.793
	No	291	79.66±16.49		42.62±7.27		56.30±10.06	
Dieting Status	Yes	57	76.35±14.95	**<0.044**	38.78±8.24	**<0.001**	55.92±10.82	0.712
	No	335	81.05±16.46		43.26±7.14		56.45±9.79	

Note. Values are presented as Mean ± Standard Deviation (SD). p-values were obtained using independent-samples t-tests. Statistically significant results ($p < 0.05$) are shown in bold.

As presented in Table 3, nutrition knowledge scores differed significantly according to the educational program, with students enrolled in faculty programs reporting significantly higher nutrition knowledge than those attending vocational schools ($p = 0.043$). In contrast, body appreciation scores were significantly higher among vocational school students than among faculty students ($p = 0.001$). No significant difference was observed in healthy lifestyle awareness according to educational program ($p > 0.05$). No statistically significant differences were found in nutrition knowledge, body appreciation, or healthy lifestyle awareness according

to whether participants had previously received nutrition education (all $p > 0.05$). With respect to dieting status, significant differences were observed for both nutrition knowledge ($p = 0.044$) and body appreciation ($p < 0.001$). Participants who were not following a diet had significantly higher nutrition knowledge and body appreciation scores than those who reported currently following a diet. However, healthy lifestyle awareness scores did not differ significantly between the two groups ($p > 0.05$).

Table 4. Comparison of Nutrition Knowledge, Body Appreciation, and Healthy Lifestyle Awareness Scores According to Participant Characteristics (One-Way ANOVA and Tukey HSD)

Variable	Category	n	BB_total Mean±SD	F (p)	η²	Tukey	BedB_total Mean±SD	F (p)	η²	Tukey	Sag_total Mean±SD	F (p)	η²
Regular exercise	Yes (a)	75	77.49±13.83	1.489 (.227)	**0.008**	-	42.45±7.61	2.973 (.052)	0.015	-	59.41±9.74	4.469 (.012)	0.02
	No (b)	152	81.32±18.35				41.59±8.35				55.88±10.87		
	Partly (c)	165	80.81±15.28				43.63±6.38				55.45±8.87		
Economic status	Low (a)	79	75.48±13.89	4.893 (.008)	0.025	a<c	41.68±8.73	3.303 (.038)	0.017	a<c	54.73±10.00	1.476 (.230)	**0.00**
	Moderate (b)	268	81.92±16.83				42.46±7.11				56.90±10.21		
	Good (c)	45	79.73±15.67				45.15±6.76				56.13±7.80		
Meal skipping	Regular meals (a)	79	79.94±15.82	0.873 (.418)	0.004	–	44.49±7.09	3.482 (.032)	0.018	a>b	55.87±10.43	3.325 (.037)	0.01
	Occasionally skip (b)	188	81.45±17.96				41.86±7.53				57.65±10.35		
	Frequently skip (c)	125	79.01±13.83				42.56±7.47				54.77±8.72		
Daily social media use	<1 h (a)	19	85.68±14.85	2.787 (.012)	0.042	a>e; d>e; g>e	39.21±8.31	2.073 (.056)	0.031	–	60.10±10.97	4.216 (<.001)	0.06
	2 h (b)	52	78.23±16.55				41.42±7.68				59.69±11.04		
	3 h (c)	75	80.80±17.59				43.53±7.17				55.14±9.86		
	4 h (d)	94	82.53±16.72				43.10±6.23				56.78±8.94		
	5 h (e)	33	71.21±12.36				43.60±6.40				50.30±8.36		
	6 h (f)	83	80.01±10.89				43.43±6.71				55.62±8.64		
	≥7 h (g)	36	83.38±22.86				40.16±11.30				58.44±11.79		

Note: η² = eta squared represents the effect size. Effect sizes are interpreted according to Cohen's classification (0.01 = small, 0.06 = medium, 0.14 = large effect).

As shown in Table 4, Healthy Lifestyle Awareness scores differed significantly according to regular exercise status (F = 4.469, p = 0.012). Tukey HSD post hoc analysis indicated that participants who exercised regularly had significantly higher Healthy Lifestyle Awareness scores than those who did not exercise and those who exercised only occasionally. In contrast, no significant differences were observed for Nutrition Knowledge (F = 1.489, p = 0.227) or Body Appreciation (F = 2.973, p = 0.052). According to perceived economic status, significant differences were found in Nutrition Knowledge (F = 4.893, p = 0.008) and Body Appreciation (F = 3.303, p = 0.038). Tukey HSD analysis showed that participants with good perceived economic status reported significantly higher Body Appreciation scores than those with low economic status. Likewise, participants with low economic status had significantly lower Nutrition Knowledge scores than those with good economic status. Healthy Lifestyle Awareness did not differ significantly across economic status groups (F = 1.476, p = 0.230). Meal-skipping habits were significantly associated with Body Appreciation (F = 3.482, p = 0.032) and Healthy Lifestyle Awareness (F = 3.325, p = 0.037). Tukey HSD comparisons indicated that participants who consumed meals regularly reported significantly higher Body Appreciation scores than those who occasionally skipped meals. Furthermore, participants who occasionally skipped meals demonstrated significantly higher Healthy Lifestyle Awareness scores than those who frequently skipped meals. No significant difference in Nutrition Knowledge was observed according to meal-skipping habits (F = 0.873, p = 0.418). Daily social media use was significantly associated with Nutrition Knowledge (F = 2.787, p = 0.012) and Healthy Lifestyle Awareness (F = 4.216, p < 0.001). Tukey HSD analysis revealed that participants using social media for 5 hours per day had significantly lower Nutrition Knowledge scores than those using social media for less than 1 hour, 4 hours, or 7 hours or more per day. Similarly, Healthy Lifestyle Awareness scores were significantly lower among participants using social media for 5 hours daily compared with those using social media for less than 1 hour, 3 hours, 4 hours, or at least 7 hours per day. No significant differences were found in Body Appreciation according to social media use (F = 2.073, p = 0.056). Effect size estimates indicated that most statistically significant differences were small (η² = 0.015–0.042), whereas the effect of daily social media use on Healthy Lifestyle Awareness was of moderate magnitude (η² = 0.062).

Table 5. Pearson Correlation Analysis Among Nutrition Knowledge, Body Appreciation, and Healthy Lifestyle Awareness

Variable	1	2	3
1. Nutrition Knowledge Scale	1		
2. Body Appreciation Scale	0.125**	1	
3. Healthy Lifestyle Awareness Scale	0.242**	0.307**	1

Note. $p < 0.05$*, *$p < 0.01$.

As shown in Table 5, Nutrition Knowledge was positively and significantly correlated with Body Appreciation (r = 0.125, p = 0.013), although the relationship was weak. Nutrition Knowledge was also positively associated with Healthy Lifestyle Awareness (r = 0.242, p < 0.001). Furthermore, Body Appreciation showed a positive low-to-moderate correlation with Healthy Lifestyle Awareness (r = 0.307, p < 0.001). These findings suggest that higher nutrition knowledge is associated with greater body appreciation and higher healthy lifestyle awareness, while individuals with more positive body appreciation also tend to exhibit greater healthy lifestyle awareness.

Table 6. Multiple Linear Regression Analysis Predicting Healthy Lifestyle Awareness

Variable	B	SE	β	t	p	Tolerance	VIF
Constant	30.312	3.362	—	9.015	<0.001	-	-
Nutrition Knowledge	0.126	0.029	0.207	4.361	<0.001	0.984	1.016
Body Appreciation	0.374	0.063	0.281	5.916	<0.001	0.984	1.016

Note. Dependent variable: Healthy Lifestyle Awareness. Model statistics: R = 0.369, R^2 = 0.136, Adjusted R^2 = 0.132, F(2, 389) = 30.727, p < 0.001, Durbin–Watson = 1.578.

Before conducting the bootstrapped indirect-effect analysis, regression assumptions were evaluated. Tolerance values (0.984) and VIF values (1.016) indicated that multicollinearity was not a concern. Furthermore, the Durbin–Watson statistic (1.578) suggested that the residuals were independent. The multiple linear regression model was statistically significant (F(2, 389) = 30.727, p < 0.001), explaining 13.6% of the variance in Healthy Lifestyle Awareness (R^2 = 0.136; adjusted R^2 = 0.132). Both Nutrition Knowledge (B = 0.126, β = 0.207, p < 0.001) and Body Appreciation (B = 0.374, β = 0.281, p < 0.001) were significantly and positively associated with Healthy Lifestyle Awareness in the regression model.

Table 7. Bootstrapped Indirect Effect of Nutrition Knowledge on Healthy Lifestyle Awareness Through Body Appreciation (PROCESS Macro Model 4)

Path	B	SE	β	t	p	95% CI
Mediator model (Outcome: Body Appreciation)						
Nutrition Knowledge → Body Appreciation (a)	0.049	0.023	0.107	2.149	0.032	0.004, 0.094
Outcome model (Outcome: Healthy Lifestyle Awareness)						
Body Appreciation → Healthy Lifestyle Awareness (b)	0.399	0.064	0.300	6.219	<0.001	0.273, 0.525
Nutrition Knowledge → Healthy Lifestyle Awareness (Direct effect, c')	0.133	0.029	0.218	4.590	<0.001	0.076, 0.190
Nutrition Knowledge → Healthy Lifestyle Awareness (Total effect, c)	0.152	0.030	0.250	5.057	<0.001	0.093, 0.211
Indirect effect (a × b)						
Nutrition Knowledge → Body Appreciation → Healthy Lifestyle Awareness	0.020	0.010	—	—	—	0.001, 0.041

Note. A bootstrapped indirect-effect analysis was conducted using PROCESS Macro Version 4.2 (Model 4; Hayes, 2022) with 5,000 bootstrap resamples. Age, body mass index (BMI), regular exercise status, nutrition education status, and perceived economic status were included as covariates in the model. An indirect effect was considered statistically significant when the 95% bootstrap confidence interval did not include zero.

As illustrated in Figure 1, the bootstrapped indirect-effect analysis presented in Table 7 indicated a statistically significant positive association between nutrition knowledge and body appreciation (B = 0.049, β = 0.107, p = 0.032). Body appreciation was also positively associated with healthy lifestyle awareness (B = 0.399, β = 0.300, p < 0.001). The total association between nutrition knowledge and healthy lifestyle awareness was statistically significant (B = 0.152, β = 0.250, p < 0.001). After accounting for body appreciation, the direct association between nutrition knowledge and healthy lifestyle awareness remained statistically significant (B = 0.133, β = 0.218, p < 0.001). Furthermore, the bootstrapped analysis indicated a statistically significant indirect effect (effect = 0.020, BootSE = 0.010, 95% CI = 0.001–0.041). Because the confidence interval did not include zero, the findings indicate a statistically significant indirect association between nutrition knowledge and healthy lifestyle awareness through body appreciation.

Discussion

The primary aim of this study was to examine the associations among nutrition knowledge, body appreciation, and healthy lifestyle awareness among female university students residing in dormitories. The findings indicated that nutrition knowledge was positively associated with body appreciation and healthy lifestyle awareness, while body appreciation was also positively associated with healthy lifestyle awareness. The bootstrapped indirect-effect analysis further indicated a statistically significant indirect association between nutrition knowledge and healthy lifestyle awareness through body appreciation (Tey et al., 2025; Masri et al., 2024; Pushpa et al., 2024). The direct association between nutrition knowledge and healthy lifestyle awareness remained statistically significant after accounting for body appreciation, indicating that the observed association between nutrition knowledge and healthy lifestyle awareness was not fully accounted for by body appreciation. These findings suggest that body appreciation may represent one psychosocial factor associated with the relationship between nutrition knowledge and healthy lifestyle awareness, although the cross-sectional design does not permit causal or temporal conclusions. From a theoretical perspective, nutrition knowledge may provide an important cognitive resource for health-related decision-making, while positive body appreciation may be associated with healthier lifestyle orientations. According to Social Cognitive Theory, nutritional knowledge, self-efficacy,

and perceptions of the self may interact in shaping health-related behaviors (Alharballeh & Dodeen, 2023; Simbar et al., 2020). However, the observed indirect association should not be interpreted as evidence that nutrition knowledge causes changes in body appreciation or that body appreciation subsequently causes healthier lifestyle behaviors. Other factors, including stress management, academic pressure, and institutional environmental support, may also be relevant to healthy lifestyle awareness (Douglas et al., 2025; González-Fernández et al., 2024). Accordingly, these findings suggest that healthy lifestyle promotion may benefit from approaches that combine nutrition education with attention to positive body appreciation and psychosocial well-being.

The correlation analyses demonstrated a weak but significant positive relationship between nutrition knowledge and body appreciation, suggesting that higher levels of nutrition knowledge were associated with more positive evaluations of one's body. Likewise, nutrition knowledge was positively associated with healthy lifestyle awareness, indicating that individuals with greater nutrition knowledge reported higher levels of awareness regarding behaviors that promote and protect health (Bozkurt et al., 2022; Wenas et al., 2022; Erdoğan, 2023; Kosendiak et al., 2024; Anjelita et al., 2024; Alptekin & Duman, 2025). Furthermore, body appreciation was positively associated with healthy lifestyle awareness, indicating that students with more positive body perceptions also reported higher levels of healthy lifestyle awareness. Nevertheless, the relatively low-to-moderate correlation coefficients suggest that healthy lifestyle awareness cannot be explained solely by nutrition knowledge and body appreciation but is also associated with multiple factors, including physical activity, psychological well-being, social support, living conditions, and environmental influences (Caamaño-Navarrete et al., 2024; Barcın Güzeldere et al., 2025). These findings reinforce the multidimensional nature of healthy lifestyle awareness and indicate that it cannot be adequately explained by a single determinant such as nutrition knowledge or body appreciation alone (Ibrahim & Aldawsari, 2024; Elmskini et al., 2024). Accordingly, simultaneously addressing nutrition knowledge and positive body appreciation may be relevant to health promotion strategies targeting healthy lifestyle awareness among university students (Shi et al., 2026).

Comparisons based on demographic characteristics revealed that perceived economic status, meal-skipping habits, and daily social media use were associated with significant differences in several study variables. Students with better perceived economic status reported significantly higher body appreciation than those with lower economic status. This finding is consistent with previous research suggesting that socioeconomic circumstances may be associated with body image and related psychosocial outcomes (Evcili & Eroğlu, 2024; Pop et al., 2021; Khaleel et al., 2025). Similarly, students who consumed regular meals demonstrated higher body appreciation scores than those who skipped meals, indicating an association between regular eating patterns and body appreciation. In addition, students who occasionally skipped meals reported higher healthy lifestyle awareness than those who frequently skipped meals, suggesting that healthy lifestyle awareness may reflect an overall pattern of lifestyle characteristics rather than perfect adherence to individual healthy practices (Güneş & Demirer, 2025; Rounsefell et al., 2020). Significant differences were also observed in nutrition knowledge and healthy lifestyle awareness according to daily social media use. Notably, students who reported approximately five hours of daily social media use had significantly lower nutrition knowledge and healthy lifestyle awareness scores than several other groups. Excessive social media exposure has been associated in previous studies with greater exposure to misinformation, sedentary behaviors, and unrealistic body ideals, which may be relevant to health-related attitudes and behaviors (Blanchard et al., 2023; Dumlu Bilgin et al., 2024; Behera et al., 2025). However, body appreciation did not significantly differ according to social media use duration, suggesting that the relationship between social media use and body appreciation may depend on factors such as usage purposes, content exposure, and individual psychosocial characteristics (Zeeni et al., 2025; Wang et al., 2025).

This study is among the limited number of studies simultaneously examining nutrition knowledge, body appreciation, and healthy lifestyle awareness within a single conceptual framework and evaluating the indirect association between these variables through body appreciation. The findings indicate that healthy lifestyle awareness is associated not only with nutrition knowledge but also with positive body appreciation. Accordingly, university health promotion programs may consider approaches that extend beyond nutrition education by incorporating components addressing positive body appreciation, psychosocial well-being, and supportive environments. For students living in university dormitories, strategies focusing on regular meal consumption, access to reliable nutrition information, and social media literacy may be relevant to the promotion of healthy lifestyle awareness. Future research should employ longitudinal designs involving larger and more diverse samples, including male students and participants from different universities, to better examine the temporal and potentially causal relationships among these variables. Furthermore, future studies may investigate the mediating or moderating roles of psychosocial variables such as self-efficacy, self-esteem, healthy eating literacy, social media addiction, and psychological well-being. Longitudinal and experimental studies involving more heterogeneous populations are needed to further evaluate the proposed indirect-effect model and determine whether the observed associations are consistent across different populations and over time.

Limitations

Several limitations should be acknowledged. First, the cross-sectional design precludes causal inferences regarding the observed relationships. Second, all data were collected using self-report questionnaires, which may be subject to social desirability and recall biases. Third, because the study included only female university students residing in dormitories, the findings cannot be generalized to male students or university populations with different sociocultural characteristics. Furthermore, the indirect association between nutrition knowledge and healthy lifestyle awareness was examined only through body appreciation; other potential mediating or moderating variables were not included in the model. Future studies should evaluate the mediating or moderating effects of variables such as physical activity, healthy eating literacy, psychological well-being, self-esteem, self-efficacy, and social media use characteristics. Despite these limitations, the study contributes to the literature by simultaneously examining body appreciation, nutrition knowledge, and healthy lifestyle awareness within a single analytical model. Moreover, because the indirect-effect model was tested using cross-sectional data, the observed indirect association should not be interpreted as evidence of a causal mediation mechanism or temporal sequence among the variables.

Conclusion

This study examined the associations among nutrition knowledge, body appreciation, and healthy lifestyle awareness among female university students residing in dormitories. The findings indicated that nutrition knowledge was positively associated with body appreciation and healthy lifestyle awareness,

while body appreciation was also positively associated with healthy lifestyle awareness. The bootstrapped indirect-effect analysis indicated a statistically significant indirect association between nutrition knowledge and healthy lifestyle awareness through body appreciation. In addition, perceived economic status, meal-skipping habits, and daily social media use were associated with significant differences in several study variables. These findings suggest that university health promotion programs may benefit from approaches that extend beyond nutrition education to include attention to positive body appreciation, regular eating habits, and access to reliable nutrition information. Multidisciplinary health promotion initiatives implemented in university and dormitory settings may be relevant to supporting healthy lifestyle awareness among students. However, given the cross-sectional design, these findings should be interpreted as associations and an indirect association rather than evidence of causal effects or a causal mediation mechanism.

Suggestions

- University nutrition education programs should incorporate behavioral and psychoeducational components that promote positive body appreciation and support healthy lifestyle awareness in addition to providing nutrition knowledge.
- Dormitory-based nutrition programs should encourage regular meal consumption and improve students' access to healthy food options.
- Educational interventions aimed at improving social media literacy should help students critically evaluate misleading or inaccurate nutrition- and body image-related digital content.
- Universities should consider expanding campus- and dormitory-based physical activity initiatives as part of broader strategies to support healthy lifestyle awareness among students.
- Future studies should extend the proposed model by investigating the mediating or moderating roles of self-efficacy, self-esteem, psychological well-being, healthy eating literacy, and social media addiction.
- Universities are encouraged to consider multidisciplinary health promotion programs involving dietitians, psychologists, and other healthcare professionals that address nutrition behaviors, body appreciation, and healthy lifestyle awareness.

Declarations

Ethics approval and consent to participate

This study was conducted in accordance with the ethical principles of the Declaration of Helsinki. Ethical approval was obtained from the Siirt University Ethics Committee before the start of the study (Approval No.: 1644, Date: 02.07.2026). Written informed consent was obtained from all participants prior to their participation in the study.

Consent for publication

Not applicable.

Availability of data and materials

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

Competing interests

The authors declare that they have no competing interests.

Clinical Trial Number

Not applicable.

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Authors' contributions

FK, RE, BÖ, ET, İA, NY and ZK conceived and designed the study, collected the data, performed the statistical analysis, and drafted the manuscript. All authors read and approved the final manuscript.

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Figures

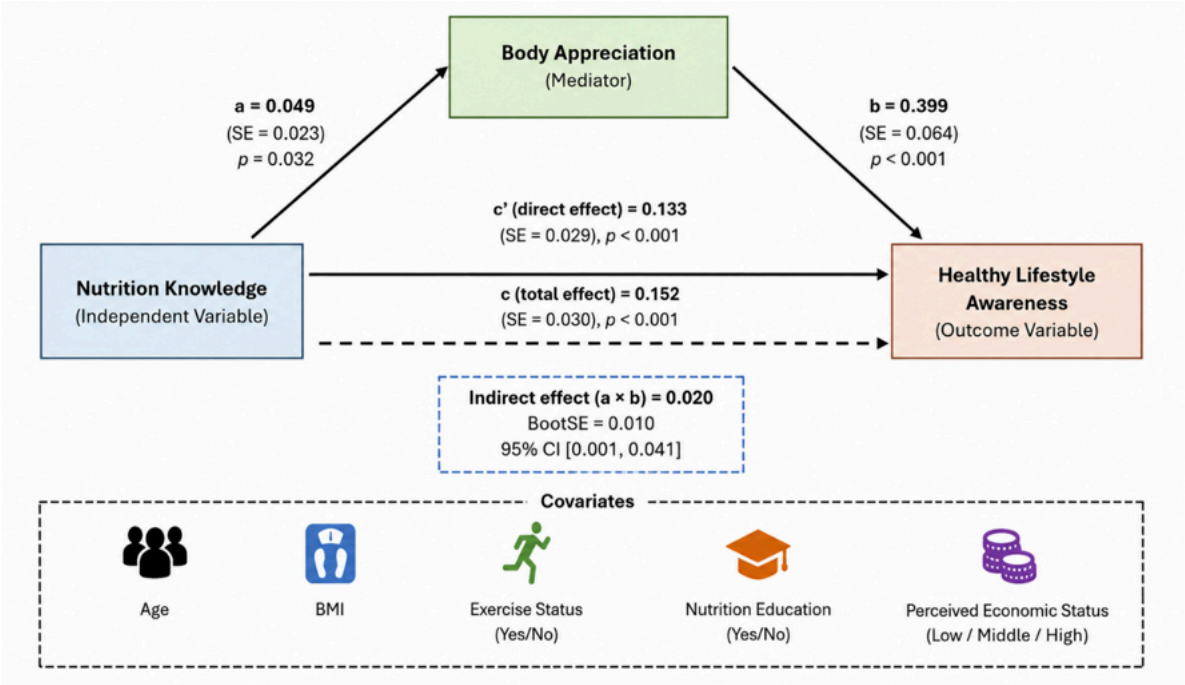


Figure 1

Bootstrapped indirect-effect model of the association between nutrition knowledge and healthy lifestyle awareness through body appreciation among female university students residing in dormitories. Path coefficients are presented as unstandardized regression coefficients (B). The indirect effect was estimated using PROCESS Macro Model 4 with 5,000 bootstrap samples. Covariates included age, BMI, exercise status, nutrition education, and perceived economic status.