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The mediating role of perceived stress: an examination of the relationship between health literacy and healthy living awareness

Müjdat Yeşildal[1], Adil Aydoğdu[1], Rumeysa Çelen[2], Tunahan Yaver[2]

[1]Department of Health Management, Faculty of Health Sciences, Selçuk University, Konya, Turkiye
[2]Master's Student, Institute of Health Sciences, Selçuk University, Konya, Turkiye

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ABSTRACT

Aims: This study aimed to explore the mediating effect of perceived stress on the relationship between health literacy and healthy lifestyle awareness. It was hypothesized that health literacy would positively predict healthy lifestyle awareness, directly and indirectly, by reducing levels of perceived stress.

Methods: This research adopted a cross-sectional and correlational design. The sample consisted of 1,150 adults residing in Konya, Turkiye. Data collection instruments included validated measures of Health Literacy, Perceived Stress, and Healthy Life Awareness. Descriptive analyses and Pearson correlation coefficients were calculated, followed by mediation testing through structural equation modeling. The significance of indirect effects was assessed using bootstrapping with 5,000 resamples and 95% confidence intervals.

Results: The sample consisted of 1,150 adults residing in Konya, with a mean age of 30.48. The majority were female (54.3%), single (59.7%), and university graduates (59.1%). The findings demonstrated that health literacy positively predicted healthy lifestyle awareness (β=0.43, $p<0.001$) and negatively predicted perceived stress (β=-0.21, $p<0.001$). In turn, perceived stress negatively predicted healthy lifestyle awareness (β=-0.19, $p<0.001$). Mediation analysis revealed a significant indirect effect of health literacy on healthy lifestyle awareness through perceived stress [β=0.02, 95% CI (0.01-0.04)]. These results supported the hypothesized mediating model.

Conclusion: The study proves that perceived stress partially mediates the relationship between health literacy and healthy lifestyle awareness. Improving health literacy may reduce perceived stress, enhancing individuals' understanding of healthy living. These findings highlight the importance of incorporating stress management and health literacy education into university health programs to promote holistic well-being.

Keywords: Health literacy, stress, awareness, health behavior

INTRODUCTION

Individuals' general well-being and quality of life are closely related to their healthy living awareness (HLA). HLA encompasses the combined knowledge, attitudes, and behaviors that empower individuals to make informed health decisions, prevent illness, and lead a more mindful lifestyle.[1] A strong sense of health identity is an important motivator for individuals to maintain healthy behaviors.[2] In this regard, strengthening health education programs can contribute to positive changes in lifestyle choices by increasing individuals' knowledge levels.[3]

Health literacy (HL), the capacity to access, comprehend, and utilize health-related information, is considered one of the key cognitive factors shaping HLA.[4,5] Extensive research has shown that individuals with higher HL levels are more effective in utilizing healthcare services, following treatment recommendations, and attaining improved health outcomes.[6,7] However, insufficient HL can lead to adverse outcomes such as exposure to misinformation, adoption of unhealthy lifestyles, and low utilization of health services.[8] In addition, HL facilitates individuals' access to reliable information and protects them from misinformation.[9] Various studies indicate that HL is positively associated with behaviors that promote health and well-being.[10-12]

However, psychological barriers may exist when translating health knowledge into behavior. In this context, perceived stress (PS) plays an important role. PS describes the mental and emotional reactions triggered when a person interprets a situation as potentially threatening or overwhelming.[13] High stress levels can negatively affect individuals' mental functions and health awareness, preventing them from maintaining

Corresponding Author: Müjdat Yeşildal, mujdatyesildal@gmail.com

healthy lifestyle behaviors.[14,15] The literature shows that stress determines individuals' cognitive and behavioral processes related to health.[16,17] This situation shows that even individuals with high HL may find it challenging to translate this information into healthy lifestyle behaviors when under stress.[18]

The theoretical basis of this study is the Social Cognitive Theory, which explains individuals' behaviors through the interaction of environmental, cognitive, and personal factors, and the Stress-Perception Theory, which argues that stress is managed through individual perception and coping processes.[13,19] In this context, testing the mediating role of PS in the relationship between HL and HLA provides a theoretically meaningful approach.

HL has been extensively studied concerning health behaviors and outcomes across various populations. Prior evidence demonstrates that higher HL is associated with better health decisions, treatment adherence, and preventive behaviors. However, most existing studies originate from Western or Asian contexts, and evidence from Turkiye remains limited. Moreover, while previous research has often established direct links between HL and healthy lifestyle behaviors, fewer studies have examined the psychological mechanisms underlying this relationship. In particular, the mediating role of PS in translating health knowledge into actual awareness and behavior has not been sufficiently explored. This gap is especially critical in Turkiye, where cultural dynamics, rapid digitalization of health information, and variations in health literacy levels may uniquely influence individuals' awareness of healthy living. By addressing this gap, the present study provides novel insights into how HL contributes to healthy lifestyle awareness through the psychological pathway of PS, thereby offering context-specific evidence for both academia and public health policy.

A limited body of research in Turkiye investigates the associations among HL, PS, and HLA. This study seeks to contribute to the literature by exploring how HL influences individuals' awareness of HLA, focusing on the mediating role of PS in this relationship. Structural equation modeling (SEM) was employed to test the hypothesized pathways. By clarifying the interaction among these variables, the study aims to enhance understanding of health-related decision-making processes and provide evidence-based insights for professionals and policymakers in shaping health education, stress reduction programs, and public health strategies.

METHODS

Ethical Approval

Ethical approval for this research was granted by the Selçuk University Faculty of Health Sciences Non-interventional Clinical Researches Ethics Committee (Date: 29.01.2025, Decision No: 2025/50). The study was conducted per the ethical principles of the Declaration of Helsinki. Before participating, individuals were fully informed about the purpose of the study, the voluntary nature of their involvement, and how their data would be kept confidential. Informed consent was obtained electronically, and participants were allowed access to the questionnaire only after providing their explicit agreement to participate.

Research Design

This study used a cross-sectional and correlational research design to investigate whether PS mediates the relationship between HL and HLA. SEM was used to analyze the proposed relationships. The conceptual model, based on theoretical frameworks related to health behavior and stress processing, as shown in **Figure**, presents HL (X) as the independent variable, PS (M) as the mediating variable, and HLA (Y) as the dependent variable. Within this framework, the following hypotheses were tested:

- **H1:** HL significantly and positively predicts HLA.
- **H2:** HL significantly predicts PS in a negative direction.
- **H3:** PS significantly predicts HLA in a negative direction.
- **H4:** PS mediates the relationship between HL and HLA.

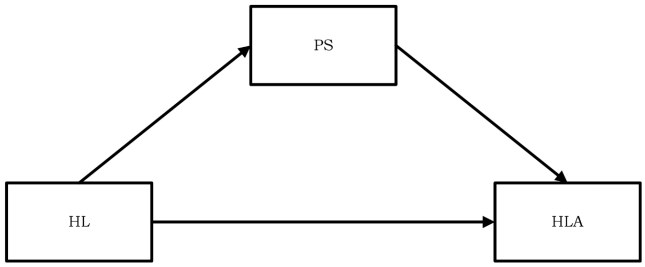

Figure. Research model

Participants and Sample

The study sample comprised individuals aged 18 and above living in the Konya province of Turkiye. 1,150 individuals were selected through convenience sampling between March and July 2025 and participated in the study. This sample size meets and exceeds the methodological recommendations commonly accepted for mediation analysis using bootstrapping techniques. In particular, mediation models involving multiple variables require a minimum of approximately 500 participants to obtain stable and robust estimates of indirect effects. Therefore, the current sample size is considered statistically sufficient regarding power and sensitivity to detect mediation effects.[20,21]

Data Collection Tools

This study collected data using a structured questionnaire consisting of standardized and validated scales. The questionnaire included demographic questions and three main tools: the Health Literacy Scale, the Perceived Stress Scale, and the Healthy Living Awareness Scale. These tools were selected based on their relevance to the study variables and their psychometric properties established in previous research.

Personal Information Form

The researchers created a Personal Information Form for this study to gather data on participants' sociodemographic attributes. This form included categorical variables such as

gender, marital status, and chronic disease status (presence or absence of chronic disease). Additionally, continuous variables such as age (in years) and monthly income (in TRY) were recorded. These variables were included to characterize the sample and to examine potential covariates in statistical analyses.

Health Literacy Scale

This study used the Health Literacy Scale to measure individuals' perceived abilities to access, understand, evaluate, and apply health-related information. The scale consists of six items and has a four-point Likert-type structure. High scores on the scale indicate a high level of HL.[22,23]

Perceived Stress Scale

The Perceived Stress Scale was used in this study to assess individuals' perceptions of stress. The scale consists of four items and is answered using a five-point Likert scale, with high scores indicating a high level of PS.[24,25]

Healthy Life Awareness Scale

In this study, the Healthy Living Awareness Scale was used to measure individuals' levels of awareness regarding healthy living behaviors. The scale consists of 15 items and is answered using a five-point Likert Scale. High scores on the scale indicate that the individual has a higher level of awareness regarding healthy living issues.[26]

Statistical Analysis

All data procedures were conducted using IBM SPSS Statistics version 30.0 and the PROCESS Macro 5.0 developed by Hayes (2022).[21] Before hypothesis testing, the dataset was assessed for normality, multicollinearity, and bivariate associations among variables. Univariate normality was evaluated through skewness, kurtosis values, and the Kolmogorov–Smirnov test; values falling within the -1 to +1 range were considered indicative of approximate normal distribution.[28,29] The internal consistency of the instruments was determined using Cronbach's alpha and McDonald's omega. Multicollinearity was examined using the Variance Inflation Factor (VIF) scores, with values below 5 suggesting no primary concern. Descriptive statistics and Pearson correlation coefficients were computed to explore the relationships among HL, PS, and HLA. The internal consistency of the instruments was determined using Cronbach's alpha, with α values of .70 or higher deemed acceptable. To address the main aim of the study, a simple mediation model (model 4) within the PROCESS Macro was employed, specifying HL as the independent variable (X), HLA as the outcome variable (Y), and PS as the mediator (M). Both direct and indirect effects were estimated using bias-corrected 95% confidence intervals derived from 5,000 bootstrap samples. Mediation was considered statistically significant if the confidence interval for the indirect effect did not include zero. A p-value of less than 0.05 was accepted as the criterion for statistical significance.

RESULTS

This section presents correlation analyses revealing the relationships between the descriptive statistics obtained in the study and the variables and findings related to the mediation model.

Table 1 outlines the demographic profile of the 1,150 individuals who participated in the study. Among them, 54.3% were female and 45.7% were male. Most participants were single (59.7%), while 40.3% were married. In terms of educational attainment, the majority held a university degree (59.1%), followed by primary school (16.5%), high school (15.8%), and postgraduate qualifications (8.5%). 11.1% reported having at least one chronic disease, whereas 88.9% reported no chronic health conditions. The mean age of the participants was 30.48 years ±12.34, with ages ranging from 18 to 78. The average monthly income was 45,616.21±30,880.57, with reported incomes ranging between 14,500 and 165,000 TRY.

Table 1. Descriptive characteristics of the participants (n=1150)

Variables		n	%
Gender	Male	526	45.7
	Female	624	54.3
Marital status	Single	686	59.7
	Married	464	40.3
Educational status	Primary school	190	16.5
	High school	182	15.8
	Bachelor's degree	680	59.1
	Postgraduate	98	8.5
Chronic disease status	Yes	128	11.1
	No	1022	88.9
Variables	M (SD)	Min	Max
Age (years)	30.48 (12.34)	18	78
Monthly income (TRY)	45616.21 (30880.57)	14500	165000

SD: Standard deviation

Table 2 summarizes the descriptive findings for the study variables, including mean scores, standard deviations, reliability estimates (Cronbach's α and McDonald's ω), and the correlations between the measured constructs. The mean score for HL was 2.89±0.49, for PS it was 3.02±0.64, and for HLA it was 3.77±0.55. The reliability levels of the instruments were found to be acceptable, with α values ranging from 0.70 to 0.86 and ω values from 0.72 to 0.87, which are considered acceptable and indicative of good internal consistency according to conventional criteria. In terms of correlations, HL was positively and moderately correlated with HLA ($r=0.43$, $p<0.001$), indicating that individuals with higher HL tend to have greater awareness of healthy living. In contrast, HL was negatively correlated with PS ($r=-0.16$, $p<0.001$), suggesting that higher HL is associated with lower stress levels. Furthermore, PS demonstrated a negative correlation with HLA ($r=-0.19$, $p<0.001$), meaning increased stress is linked to lower awareness of healthy lifestyle behaviors. These correlation coefficients fall within the small-to-moderate range, providing preliminary evidence consistent with the hypothesized mediation model.

Table 2. Descriptive statistics, internal consistency coefficients, and correlations

	M (SD)	α	ω	HL	PS	HLA
HL	2.89 (0.49)	0.70	0.72	-		
PS	3.02 (0.64)	0.86	0.87	-0.16	-	
HLA	3.77 (0.55)	0.73	0.74	0.43	-0.19	-

SD: Standard deviation, HL: Health literacy, PS: Perceived stress, HLA: Healthy living awareness

Table 3 presents the mediation analysis results examining whether PS mediates the relationship between HL and HLA. The analysis revealed that HL had a significant negative effect on PS (β=-0.16, SE=0.04, z=-5.60, p<0.001; 95% CI=-0.29, -0.14), indicating that individuals with higher HL levels tend to experience lower levels of perceived stress. Likewise, PS was found to negatively and significantly influence HLA (β=-0.12, SE=0.02, z=-4.61, p<0.001; 95% CI=-0.15, -0.06), suggesting that increased stress is associated with reduced awareness of healthy lifestyle behaviors. The mediation pathway was also statistically significant, with PS partially mediating the link between HL and HLA (β=0.02, SE=0.01, z=3.56, p<0.001; 95% CI=0.01, 0.04). This implies that HL indirectly affects HLA through reductions in PS. Furthermore, HL's direct effect on HLA remained significant (β=0.41, SE=0.03, z=15.23, p<0.001; 95% CI=0.40, 0.52). The total effect of HL on HLA was estimated at β=0.43 (z=16.05, p<0.001; 95% CI=0.42, 0.54), affirming that HL is a strong and positive predictor of HLA. These results confirm that PS is a partial mediator in the relationship between HL and HLA.

All four hypotheses (H1-H4) examined in this study were statistically significant. The results revealed that HL is a positive predictor of wellness awareness (H1), HL is negatively associated with PS (H2), PS negatively predicts wellness awareness (H3), and PS partially mediates the relationship between HL and wellness awareness (H4). These outcomes are in harmony with the study's theoretical framework and provide empirical support for the proposed model.

DISCUSSION

The study's findings indicate that HL levels significantly predict HLA. According to the results, individuals' awareness of healthy living behaviors increases as HL increases. This finding reveals that individuals' capacity to acquire, evaluate, and integrate health-related information into their daily lives plays a decisive role in adopting a healthy lifestyle. Comparable results reported in the literature suggest that individuals with greater health literacy tend to make more informed choices regarding their health and are more likely to engage in healthier lifestyle practices.[4,10,11,27] In addition, it is emphasized that as HL levels increase, individuals tend to engage in health-protective and health-promoting behaviors. Nonetheless, certain studies indicate that this relationship may not be entirely direct or robust, and variables such as self-efficacy could function as mediators or moderators within this dynamic.[28] While HL plays a significant role in this context, it represents just one of several complex and interrelated factors that influence individuals' health-related behaviors.

Another important finding of the study is that HL levels significantly and negatively affect PS. It has been observed that individuals with easier access to health-related information and who can interpret this information correctly experience less stress when faced with health problems. This situation can be interpreted as the cognitive competencies gained through HL supporting self-efficacy in uncertainty and anxiety, thereby reducing stress levels.[19] This finding is consistent with studies conducted on young adults and students, which report that depression, anxiety, and stress levels decrease as HL levels increase.[15,29] Similarly, it has been reported that lower stress levels are observed in individuals with high levels of HL.[30] However, it is stated that the relationship between HL and stress may be affected by certain contextual variables. It is proposed that this association could differ based on variables such as the intensity of the individual's illness, the extent of available social support, and cultural influences.[31] In addition, it has been observed that the stress-reducing effect of HL is only significant in individuals with low or moderate stress levels, and this effect decreases in individuals with high stress levels.[32] These findings indicate that the effect of HL on stress is context-sensitive and does not represent a universal finding.

The results obtained within the scope of the study also reveal that PS levels are negatively related to HLA. As stress levels increase, individuals' awareness of healthy lifestyle behaviors decreases. This finding is consistent with studies indicating that chronic stress negatively affects cognitive functions and leads individuals to prefer short-term comfort-seeking behaviors over long-term health goals.[33,34] Stress is particularly associated with unhealthy eating habits; individuals under stress tend to make less healthy choices.[35] Similarly, it has been found that PS reduces individuals' search for information and awareness about healthy living.[15] In addition, stress has been reported to significantly impact sleep quality, physical activity, and general lifestyle habits.[14,36,37] On the other hand, some theoretical approaches argue that stress does not always have an adverse effect, but can trigger healthy behaviors when

Table 3. Path analysis results on the mediating role of perceived stress in the effect of health literacy on healthy life awareness

				95% CI				
Type	Effect	Estimate	SE	LL	UL	β	z	p
Indirect	HL → PS → HLA	0.02	0.01	0.01	0.04	0.02	3.56	<0.001
Component	HL → PS	-0.21	0.04	-0.29	-0.14	-0.16	-5.60	<0.001
	PS → HLA	-0.11	0.02	-0.15	-0.06	-0.12	-4.61	<0.001
Direct	HL → HLA	0.46	0.03	0.40	0.52	0.41	15.23	<0.001
Total	HL → HLA	0.48	0.03	0.42	0.54	0.43	16.05	<0.001

SE: Standard error, CI: Confidence interval, LL: Lower limit, UL: Upper limit, HL: Health literacy, PS: Perceived stress, HLA: Healthy living awareness

perceived by the individual as a "challenge".[13] In this regard, it should be noted that the impact of stress may vary depending on individual differences, coping strategies, and perception patterns.

One of the study's most striking findings is that PS partially mediates the relationship between HL and HLA. This mediating effect, tested using structural equation modeling, revealed that as individuals' HL levels increase, their stress levels decrease, positively impacting HLA. In other words, HL not only influences an individual's knowledge level but also affects stress levels, thereby supporting HLA in a bidirectional manner. This finding aligns with the theoretical framework of Baron and Kenny's model, one of the most commonly used frameworks for testing mediation relationships.[38] It has been observed that individuals with high HL are better able to evaluate health-related issues and are more resilient in the face of stress; this psychological advantage has been shown to influence healthy lifestyle behaviors positively. This finding is supported by various studies demonstrating that HL is related to knowledge levels and psychological well-being.[17,39,40] On the other hand, it is emphasized that the effects of HL should be evaluated in terms of environmental factors such as social support, access to health services, and economic conditions.[41,42] In this context, it should be borne in mind that the indirect effects of HL on stress may be strengthened or weakened by contextual variables.

Overall, this study highlights the need for strategies that increase individuals' knowledge and support their psychological resilience to improve their awareness of healthy living. In this context, enriching HL education with stress management content could increase individuals' knowledge and strengthen their psychological resilience. The findings provide strong evidence for developing comprehensive public health policies that support individuals' health-related decision-making processes. Overall, this study highlights the need for strategies that increase individuals' knowledge and support their psychological resilience to improve their awareness of healthy living. In this context, enriching HL education with stress management content could increase individuals' knowledge and strengthen their psychological resilience. The findings provide strong evidence for developing comprehensive public health policies that support individuals' health-related decision-making processes.

Limitations

This research has certain limitations. Firstly, the data were collected through an online, self-report questionnaire, which may introduce response bias due to social desirability effects. Secondly, the cross-sectional design prevents causal inferences about the relationships among the variables. Thirdly, although the intended target population was the general Turkish public, the overrepresentation of younger and highly educated individuals reduces the representativeness of the findings. Moreover, the use of a convenience sampling method further limits generalizability. Therefore, despite the large sample size, the results should be interpreted cautiously and may not fully reflect the broader Turkish adult population, particularly older adults or those with lower educational attainment.

CONCLUSION

This study demonstrated that health literacy directly increases awareness of healthy living and indirectly reinforces this effect by reducing perceived stress. These findings highlight health literacy not only as an informational resource but also as a psychological asset that supports resilience and well-being. Strengthening health literacy education-particularly when combined with stress management skills-may enhance individuals' ability to make informed health decisions and adopt healthier lifestyles. For Turkiye, integrating such programs into university curricula and community health initiatives could support national strategies to reduce preventable health risks and promote long-term wellness. Future research should employ longitudinal and experimental designs to confirm causality and explore additional psychosocial variables influencing this relationship.

ETHICAL DECLARATIONS

Ethics Committee Approval

The study was carried out with the permission of the Selçuk University Faculty of Health Sciences Non-interventional Clinical Researches Ethics Committee (Date: 29.01.2025, Decision No: 2025/50).

Informed Consent

Informed consent was obtained electronically, and participants were allowed access to the questionnaire only after providing their explicit agreement to participate.

Referee Evaluation Process

Externally peer-reviewed.

Conflict of Interest Statement

The authors have no conflicts of interest to declare.

Financial Disclosure

The authors declared that this study has received no financial support.

Author Contributions

All of the authors declare that they have all participated in the design, execution, and analysis of the paper, and that they have approved the final version.

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