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Original Article

How Character Strengths Promote Flourishing in Medical Students: The Mediating Role of Resilience

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Abstract

Background: Medical students often face considerable psychological challenges, jeopardizing their well-being. Character strengths and resilience are key constructs in positive psychology that may enhance flourishing, yet their underlying mechanisms require further investigation in medical education contexts.

Objectives: This study aimed to examine the relationship between character strengths and flourishing among Iranian medical students, focusing on the mediating role of resilience.

Methods: A total of 387 medical students were selected through multi-stage cluster sampling. Participants completed the Brief Strengths Test (BST), the Connor-Davidson Resilience Scale (CD-RISC-10), and Rashid & Seligman flourishing inventory. Data were analyzed using structural equation modeling (SEM) and bootstrapping procedures.

Results: SEM revealed that character strengths had a significant direct effect on flourishing ($\beta = 0.425$, $P < 0.01$) and an indirect effect through resilience. Bootstrapped analyses confirmed a significant partial mediation, indicating that resilience accounts for a meaningful portion of the link between character strengths and flourishing (indirect effect $\beta = 0.204$, $P < 0.01$).

Conclusion: These findings underscore the dual role of character strengths in promoting flourishing directly and indirectly by enhancing resilience. Strengths-based educational interventions and resilience-building programs may foster sustainable well-being in medical students, especially within demanding academic environments.

Keywords: Flourishing; Character Strengths; Resilience; Medical Students

Background

Medical education is globally recognized as a high-pressure training environment that places students at significant risk for psychological distress. Large-scale meta-analyses report that approximately 44% of medical students experience burnout, with anxiety and depression affecting around one-third of trainees worldwide (1, 2). High levels of stress and resilience-related challenges have been observed in diverse regions, further underscoring the global pervasiveness of this issue (3). Recent multinational studies have further confirmed that psychological distress among medical trainees remains a widespread concern across Asia, Europe, and North America, suggesting that such challenges are not merely culturally bound but structurally embedded in medical education systems (2, 4).

Iranian medical students mirror this global trend. A national study reported prevalence rates of 37.5% for depression, 41.1% for anxiety, and academic burnout ranging between 9–23% among medical students (5). Moreover, a broader survey of Iranian students found that over 77% scored positively on a general mental health screening instrument, indicating widespread well-being concerns (6). These findings highlight the urgent need to identify promotive factors that sustain well-being rather than focusing solely on psychopathology. These patterns align with those observed in other Middle Eastern countries (7), pointing to both global and regional stressors such as rigorous curricula, competitive admission processes, and sociocultural stigma around mental health. Comparable findings from Western and East Asian contexts highlight that excessive academic workload and perfectionistic expectations are universal predictors of

burnout and mental distress among medical students (7, 8).

Medical training universally involves heavy academic workloads, high-stakes evaluations, and emotionally demanding clinical rotations (9). However, in Iran, these pressures are compounded by contextual factors including large class sizes, rigid hierarchical structures, limited student autonomy, financial uncertainty, and cultural stigma around seeking help (10, 11). Thus, Iranian medical education provides a distinctive context to examine how internal psychological strengths can buffer distress and promote flourishing. Despite these challenges, most existing efforts in Iranian medical programs have focused on deficit-based individual interventions—such as stress management and symptom reduction—while relatively neglecting strengths-based frameworks that aim to cultivate positive psychological resources. The current study addresses this conceptual gap by examining character strengths and psychological resilience—not merely as individual traits but as promotive assets that contribute to sustainable well-being in this demanding context.

Theoretical foundations suggest that medical education can benefit from a more holistic approach rooted in positive psychology. Positive psychology, with its focus on strengths, resilience, and flourishing, offers an alternative framework to traditional deficit-oriented approaches (12). Flourishing, conceptualized through Seligman's PERMA model (positive emotion, engagement, relationships, meaning, and accomplishment), extends well-being beyond symptom relief (13). In medical education, flourishing has been tied to greater engagement, empathy, and reduced burnout (14, 15). International research further supports this view. For instance, a longitudinal study across 12 European medical schools found that well-being initiatives emphasizing meaning, relationships, and autonomy substantially improved students' flourishing and professional identity formation (16). Similarly, evidence from different cultural settings shows that flourishing functions as a universal protective factor against academic burnout and emotional exhaustion (17, 18).

Nonetheless, little is known about the psychosocial processes by which positive traits promote flourishing, particularly within non-Western medical student populations. Although several mediation studies have examined the links between character strengths, resilience, and well-being, the vast majority of this work has been conducted with Western student samples, and there is little published evidence on whether the same mechanisms operate in Iranian or other Middle Eastern medical education contexts. Therefore, examining these constructs within a non-Western, high-stress academic setting offers novel insight into the cross-cultural generalizability of positive psychological models.

According to the Character Strengths and Virtues (CSV) framework proposed by Seligman and Peterson, character strengths are organized into six principal virtues: wisdom, courage, humanity, justice, temperance, and transcendence. These 24 character strengths are regarded as universally valued and are believed to promote optimal functioning and human flourishing. For example, the virtue of wisdom includes creativity, curiosity, and love of learning—traits especially relevant in educational settings. Research suggests that students who actively apply their character strengths demonstrate greater motivation, persistence, and engagement (19, 20) , which are crucial for navigating the challenges of medical education. The VIA classification of character strengths has been linked to academic engagement and life satisfaction across diverse student groups (21). Meta-analyses confirm that signature strengths interventions enhance well-being and academic outcomes in general populations (22). Among medical trainees, traits such as grit and self-regulation have been associated with lower emotional exhaustion and improved well-being (23). Furthermore, empirical evidence indicates that strengths such as perseverance, curiosity, social intelligence, and gratitude foster positive emotions and adaptive coping, thereby contributing to flourishing (24, 25). However, such studies are almost exclusively conducted in Western contexts, leaving significant gaps in research among Iranian medical students.

A key mechanism through which character strengths may foster flourishing is resilience, defined as the ability to adapt and thrive amid adversity (26). Longitudinal research indicates that higher resilience in medical students is associated with reduced burnout and increased life satisfaction, and it mediates the relationship between academic stress and well-being (3, 27). Recent research has shown that certain strengths such as hope and perseverance promote adaptive coping and emotional balance following interpersonal loss (28), while other studies have found that strengths like zest and gratitude are associated with greater resilience and academic achievement among university students (29). Moreover, evidence from populations exposed to chronic conflict indicates that character strengths can buffer the

adverse effects of prolonged stress and contribute to sustained well-being (30). Yet, most resilience research remains cross-sectional, with limited focus on mediation and scant inclusion of positive personality traits in models of flourishing. Thus, identifying the mediating function of resilience within the strength–flourishing link may illuminate a key pathway for sustainable adaptation among medical students.

Recent empirical studies offer preliminary support for these theoretical propositions. For instance, Martínez-Martí et al. (31) found that character strengths significantly predicted increases in well-being during the highly stressful period of the COVID-19 lockdown. Similarly, de la Fuente et al. (32) identified resilience as a key mediating mechanism linking character strengths to flourishing.

Furthermore, resilience is best understood as a dynamic, interactive process. The Social-Ecological Resilience Theory posits that resilience emerges not only from individual resources but also from contextual factors such as mentoring, peer support, and institutional structures (33). In Iranian medical schools, where the curriculum is highly standardized and hierarchical, factors like mentorship quality and peer cohesion may significantly influence students' resilience. Moreover, Self-Determination Theory (SDT) asserts that the fulfillment of fundamental psychological needs—autonomy, competence, and relatedness—facilitates intrinsic motivation, enhances resilience, and supports overall well-being (34). Research in medical contexts has demonstrated that need-supportive climates—particularly those fostering autonomy—enhance resilience and psychological health**.** For example, instructor autonomy support indirectly improves student well-being via increased satisfaction of psychological needs (35). Additionally, satisfaction of basic needs—especially competence—predicts greater resilience and better psychological well-being among medical students (36).

Integrating these theoretical lenses provides a comprehensive rationale for the current model. PERMA explains the multidimensional nature of flourishing, SDT clarifies how need satisfaction underpins resilience, the Social-Ecological perspective situates resilience within contextual supports, and Conservation of Resources (COR) theory explains how psychological strengths and resilience function as personal resources that protect against loss and promote gain spirals in well-being. Together, these complementary perspectives justify an integrative model linking character strengths, resilience, and flourishing in demanding educational contexts.

Despite the overlapping importance of character strengths, resilience, and contextual need supports, the extant literature remains fragmented. Few studies incorporate character strengths as predictors of resilience, and even fewer test comprehensive mediation models in medical student populations. In particular, while interventions targeting character strengths—such as identifying and cultivating students' signature strengths—have shown promise in educational settings (22, 37), their specific application in medical education remains underexplored.

Accordingly, this study represents the first known attempt to test a structural equation mediation model examining the indirect effect of character strengths on flourishing via resilience among Iranian medical students. This research not only extends positive psychology theory to a non-Western educational context but also integrates multiple theoretical perspectives into a single empirically testable model—thereby advancing both conceptual understanding and applied practice in medical education.

The present study aims to address these gaps by examining whether resilience mediates the effect of character strengths on flourishing among Iranian medical students. Drawing on PERMA, Social-Ecological Resilience Theory, SDT, and Conservation of Resources theory (38), we propose a model wherein strengths such as perseverance and gratitude both enhance resilience and directly contribute to flourishing. We hypothesize:

1. Character strengths will positively predict flourishing.
2. Resilience will mediate the relationship between character strengths and flourishing.

It is important to note that the present study conceptualizes character strengths as a higher-order latent construct reflecting the overall pattern of positive traits rather than examining the unique predictive weight of each individual strength. This approach aligns with prior structural models in positive psychology that emphasize the synergistic function of character strengths as integrated resources rather than isolated attributes. Accordingly, the study aims to test a general mediation mechanism rather than the relative contribution of specific strengths. By empirically testing this integrative model in a non-Western sample, we contribute to theoretical advancement and provide evidence for interventions—like strengths-based curricula, resilience training, and autonomy-supportive

faculty development—designed to promote sustainable well-being in demanding educational contexts.

Objectives

This study aimed to examine the relationship between character strengths and flourishing among Iranian medical students, focusing on the mediating role of resilience.

Methods

Participants and procedure: The present research employed a descriptive correlational design. The study population consisted of all students enrolled at Kashan University of Medical Sciences during the winter of 2024 (N = 3560). The sample size was determined according to established guidelines for structural equation modeling (SEM). Following the commonly cited N:q rule (39), which recommends 5 to 10 participants per free parameter, and given the number of free parameters in the present model, an adequate sample would range between approximately 245 and 490 participants. The present study recruited 387 students were recruited.

A stratified multi-stage cluster sampling method was employed to ensure representativeness across faculties and academic levels. In the first stage, the main faculties of the university (Medicine, Nursing and Midwifery, Health, Paramedical Sciences, and Dentistry) were identified as strata. In the second stage, classes were randomly selected from each faculty in proportion to the number of students enrolled in that faculty. Within each selected class, students were invited to participate voluntarily. This approach ensured that both undergraduate and professional doctoral students were proportionally represented. The gender distribution of the final sample was approximately balanced, reflecting the actual composition of the student body. Eligibility criteria comprised enrolment at Kashan University of Medical Sciences and the provision of voluntary consent to participate. Exclusion criteria included unwillingness to participate and incomplete questionnaire responses. All participants were fully informed about the anonymous and confidential management of the data, and informed consent was obtained prior to study participation.

The data collection instruments included a demographic form (recording age and gender) and three validated scales measuring character strengths, resilience, and flourishing. Questionnaires were administered in person during class sessions, and participants were allotted approximately 15-20 minutes to complete them.

Measures

Flourishing: Flourishing. Flourishing was assessed using the 25-item PERMA-based Flourishing Inventory (Rashid & Seligman, 2018). Respondents indicated their agreement on a 5-point Likert scale (1 = *never* to 5 = *always*). The scale measures five dimensions of well-being: (a) Positive Emotion (e.g., "*I feel happy*"), (b) Engagement (e.g., "*I engage in activities that require the application of my strengths*"), (c) Relationships (e.g., "*I feel a sense of belonging with my loved ones"),* (d) Meaning (e.g., "*I feel my life has a purpose*"), and (e) Accomplishment (e.g., "*I have accomplished many things well in my life*"). Higher summed scores on each subscale and the total indicate greater perceived flourishing. The instrument has demonstrated satisfactory factorial validity and internal consistency across non-clinical and populations in multiple cultural contexts, where previous studies have supported the structural equivalence of the PERMA dimensions in university samples. Previous Iranian research has examined PERMA-based measures of flourishing and confirmed their psychometric soundness in student populations (α = 0.89) (40). In the present study, the Rashid and Seligman PERMA-based Flourishing Inventory demonstrated satisfactory internal consistency, with Cronbach's alpha coefficients of 0.837 for Positive Emotion, 0.754 for Engagement, 0.853 for Relationships, 0.871 for Meaning, and 0.859 for Accomplishment, indicating good reliability in the current medical-student sample.

Character strength: The Brief Strengths Test (BST) is a psychometric tool designed to assess individual character strengths, encompassing six core components: wisdom and knowledge (e.g., "*I enjoy exploring new ideas.*"), courage (e.g., "*I face challenges with determination.*"), humanity (e.g., "*I am considerate and kind to others.*"), justice (e.g., "*I treat all people fairly.*"), temperance (e.g., "*I am disciplined and self-controlled.*"), and transcendence (e.g., "*I feel a sense of purpose in life.*"). The original scale developed by Peterson and Seligman (41) included 48 items, while the abbreviated version consists of 24 items rated on a five-point Likert scale from 1 (*strongly disagree*) to 5 (*strongly agree*), yielding total scores between 24 and 120, with higher scores indicating a greater presence of character strengths. In the original development by Peterson and Seligman (41) internal consistency (Cronbach's alpha) for the six subscales ranged from 0.70 to 0.73.

Although prior Iranian research has employed character strengths measures, such as the Farsi version of

the VIA-Y-96 in adolescents (42) and the VIA-IS-48 in adults (α = 0.98), no published study has specifically examined the psychometric properties of the BST-24 in an Iranian medical-student sample. The present findings therefore extend the evidence base by demonstrating both construct validity via CFA and good internal consistency in this population. In the present study, Cronbach's alpha coefficients demonstrated satisfactory internal consistency across all subscales: 0.850 for wisdom and knowledge, 0.873 for courage, 0.750 for humanity, 0.738 for justice, 0.870 for temperance, and 0.885 for transcendence. These results indicate high reliability of the BST in the current sample.

Resilience: Resilience was measured by adapting 10 items from The Connor-Davidson Resilience Scale – 10-Item Version (CD-RISC-10), which is a concise self-report instrument designed to assess resilience, defined as the ability to thrive in the face of adversity. Each item is rated on a 5-point Likert scale ranging from 1 (*strongly disagree*) to 5 (*strongly agree*), yielding total scores between 0 and 40, with higher scores indicating greater resilience. The scale includes items such as "*I am able to adapt to change*" and "*I tend to bounce back after illness or hardship*". The original 25-item CD-RISC was developed by Connor and Davidson (43) to measure resilience across various populations. Recognizing the need for a more efficient assessment tool, Campbell-Sills and Stein (44) refined the scale to a unidimensional 10-item version, demonstrating robust psychometric properties, including high internal consistency (Cronbach's alpha = 0.85) and construct validity. Subsequent studies have validated the CD-RISC-10 across diverse populations, reinforcing its reliability and utility as a measure of resilience. Rezaeipandari et al. (45) indicated that this version has satisfactory psychometric properties, including high internal consistency (Cronbach's α = 0.89) and good construct validity, supporting its use in Persian-speaking populations. In the current sample, Cronbach's alpha was .885, indicating acceptable reliability.

Data Analysis: Data analyses were performed using SPSS (Version 22) and AMOS (Version 22), with parameters estimated via maximum likelihood estimation. Preliminary screening procedures assessed the presence of missing values, outliers, and adherence to assumptions of multivariate normality. Based on the results of Little's test, the data were missing completely at random (MCAR) ($\chi^2_{(719)} = 698.60$, $p = 0.702$). We used Expectation Maximization (EM), which is a robust and suitable estimation technique for SEM (46), to evaluate the missing data. EM is an iterative algorithm used to restore the complete data matrix by maximum likelihood estimation (47).

Next, univariate outliers were investigated by Z-standardized values and scatter plots while multivariate outliers were examined by Mahalanobis distances (D^2). Two univariate outliers were winsorized. Skewness and kurtosis values between -2 and +2 indicate no substantial departure from normality (48). Thus, the univariate normality assumption was not violated in the present study (Table 1).

Table 1. Descriptive statistics and correlations between the variables

Variables	Character strength	Resilience	Flourishing
1) Character strength	1		
2) Resilience	0.421** (95% CI [0.330, 0.503])	1	
3) Flourishing	0.394** (95% CI [0.317, 0.467])	0.493** (95% CI [0.420, 0.560])	1
Range	50-112	18-48	49-110
Mean	84.127	33.001	82.686
SD	13.814	6.6	14.021
Skewness	-0.601	-0.278	-0.277
Kurtosis	-0.113	-0.611	-0.858

Values in parentheses represent 95% bias-corrected and accelerated (BCa) bootstrap confidence intervals based on 2000 resamples. *$P < 0.05$; **$P < 0.01$

Furthermore, based on Meyers, Gamst, and Guarino's (49) recommendation, Mahalanobis distances were computed to evaluate multivariate outliers for each case. The results of Mahalanobis distance indicated no multivariate outliers. Accordingly, data from 387 participants were included in the analyses (49.6% male, n = 192; 50.4% female, n = 195; M age = 23.1 years).

To ensure the appropriateness of the measurement instruments for application across specific contexts, three independent confirmatory factor analyses (CFAs) were conducted to evaluate construct validity, all of which

demonstrated satisfactory model fit (Table 2). Subsequently, Structural Equation Modeling (SEM) was employed to test the mediating role of resilience in the association between character strength and flourishing.

Table 2. CFA results and reliability coefficients for the measurement instruments

	CMIN	DF	CMIN/DF	P	CFI	RMSEA	SRMR	α
Character strength	375.782	237	1.586	<0.001	0.969	0.039	0.032	0.918
Resilience	96.265	33	2.917	<0.001	0.957	0.070	0.038	0.885
Flourishing	407.120	265	1.536	<0.001	0.966	0.037	0.041	0.917
Acceptable value	CMIN/DF<5		< 0.05		≥0.90	< 0.08	< 0.08	≥0.70

Results

Descriptive statistics, including the means and standard deviations for the three study variables, are presented below: Flourishing (82.64 ± 14.01 for males & 82.72 ± 14.06 for females), character strength (84.05 ± 13.65 for males & 84.19±14 for females), and resilience (32.98±6.41 for males & 33.01±6.79 for females). The results of independent samples *t* tests indicated no statistically significant differences between males and females in terms of flourishing (t=-0.55, p=0.956), character strength (t=-0.102, p=0.919), and resilience (t=-0.047, p=0.962). Table 2 demonstrates the results of first-order CFAs conducted using Maximum Likelihood Estimation method in Amos software and the reliability indices of flourishing, character strength, and resilience scales. As shown in Table 2, all three measurement models met the recommended cutoffs proposed by Hu and Bentler (50), with excellent fit indices (CFI values between 0.957 and 0.969, RMSEA values between 0.037 and 0.070, and SRMR values between 0.032 and 0.041), indicating that the measurement structures were adequately specified and psychometrically sound.

Table 1 reports the descriptive statistics (means, standard deviations, skewness, and kurtosis) as well as the Pearson correlation coefficients among the study variables.

As shown in Table 1, both character strength and resilience were positively and significantly correlated with flourishing, indicating that higher levels of character strength and resilience are associated with greater flourishing among students.

To further test these relationships, Structural Equation Modeling (SEM) was employed to examine the mediating role of flourishing in the link between character strength and resilience. SEM is particularly well suited for simultaneously modeling latent constructs with multiple indicators while accounting for measurement error. In addition, the mediating effect of resilience was examined using a nonparametric bootstrapping procedure with 2,000 resamples and 95% bias-corrected confidence intervals. The indirect effect of character strength on flourishing through resilience was statistically significant (standardized indirect effect = 0.204, 95% CI [0.134, 0.289]), as the confidence interval did not include zero. This result supports the hypothesized mediation model, indicating that resilience partially transmits the effect of character strengths on students' flourishing. The fit of the structural equation model was evaluated using multiple fit indices, which indicated that the proposed model demonstrated an acceptable level of fit. (χ^2/df = 1.922, GFI= 0.918, CFI=0.945, TLI=0.936, IFI=0.946, RMSEA=0.049, SRMR=0.051). Concerning RQ1, the findings revealed a positive and direct relationship between character strength and both flourishing (β = 0.380) and resilience (β = 0.659). Furthermore, resilience showed a positive association with flourishing (β = 0.549). In response to RQ2, character strength was indirectly linked to flourishing via resilience (β = 0.374). Table 3 presents both the direct and indirect effects, along with their corresponding 95% confidence intervals, for the structural model.

Table 3. Direct and indirect effects and 95% confidence intervals for the structural model

Model pathways	B	SE	*β*	P	95% CI	
					Lower bound	Upper bound
Direct effects						
Character strength ⟶ Flourishing	0.590	0.103	0.425	0.001	0.301	0.539
Character strength ⟶Resilience	0.131	0.019	0.549	0.001	0.435	0.644
Resilience⟶Flourishing	2.160	0.386	0.371	0.001	0.246	0.491
Indirect effect						
Character strength ⟶Resilience ⟶Flourishing	0.283	0.061	0.204	0.001	0.134	0.289

Discussion

The current study investigated the relationship between character strengths and flourishing among medical students, by assessing the mediating role of resilience. The findings confirmed the first hypothesis, indicating that character strengths significantly and positively predict flourishing among medical students. This aligns with prior research suggesting that individuals who actively use their personal strengths are more likely to experience higher levels of well-being, meaning, and engagement (24, 25).

Character strengths such as perseverance, curiosity, social intelligence, and gratitude are known to promote positive emotions, facilitate adaptive coping, and foster a sense of purpose—all of which are essential components of flourishing.

In the context of medical education, where students are exposed to chronic stress and performance pressures, drawing upon one's personal strengths may act as a psychological buffer, enhancing motivation, academic satisfaction, and emotional resilience (31). By engaging their strengths in everyday academic and interpersonal situations, students may cultivate a greater sense of competence and autonomy, which are central to sustained well-being.

These findings are further supported by positive psychology theories, such as the broaden-and-build theory (51), which posit that strengths contribute to the development of enduring personal resources. Accordingly, activating one's strengths may not only yield momentary positive emotions but also build cumulative psychological capacities conducive to long-term flourishing.

Beyond their direct association with flourishing, the findings reveal that character strengths also exert an indirect effect on flourishing through resilience, thereby supporting the hypothesized mediating role. This result is consistent with theoretical perspectives suggesting that character strengths are foundational resources that foster resilience by promoting adaptive cognitive, emotional, and behavioral responses to adversity (32, 52).

Resilience enables individuals to maintain psychological equilibrium in the face of challenges and setbacks, which is particularly crucial for medical students navigating a high-stress academic environment. Character strengths such as self-regulation, perseverance, and hope may empower students to persist despite obstacles, reinterpret stressors constructively, and sustain motivation under pressure—key components of resilient functioning. Empirical evidence also supports this mechanism. For example, research shows that individuals with higher levels of strengths are more likely to engage in positive reappraisal, emotional regulation, and proactive coping—all of which contribute to greater resilience and, ultimately, flourishing (28-30).

In this regard, resilience may serve as a psychological conduit through which strengths are translated into long-term well-being. The partial mediation observed in our model suggests that while strengths can directly enhance flourishing, their beneficial effects are partly channeled through students' resilient capacities. This highlights the value of strength-based educational and psychological interventions aimed at not only identifying students' character strengths but also cultivating their resilience as a complementary pathway to sustained flourishing. These mediation results can also be theoretically interpreted through the broaden-and-build framework of positive emotions (51). According to this model, activating personal strengths generates positive emotional experiences that broaden individuals' thought–action repertoires, thereby enabling the development of enduring psychological resources such as resilience. In turn, resilience functions as a built resource that facilitates adaptive coping and sustained well-being, explaining how strengths indirectly foster flourishing over time. This theoretical linkage underscores that the emotional and cognitive expansion initiated by strengths use serves as a mechanism through which resilience mediates the relationship between character strengths and flourishing in medical students. These findings should also be interpreted in light of the Iranian cultural context, which is characterized by strong collectivistic values, family cohesion, and a sense of interdependence. In such social environments, personal strengths often manifest through communal engagement and moral responsibility rather than through individual achievement. This cultural orientation may amplify the mediating role of resilience, as adaptive coping in collectivist cultures is frequently reinforced by shared emotional resources, social support, and collective meaning-making. The emphasis on virtues such as gratitude, humility, and perseverance within Iranian cultural narratives aligns closely with the moral dimensions of character strengths, facilitating their translation into psychological resilience and flourishing. Consequently, the observed mediation pattern may reflect not only universal mechanisms proposed by positive psychology but also culturally embedded pathways through which moral and relational virtues contribute to enduring well-being.

This study tackles an important gap in the literature—namely, the limited integration of positive psychology and resilience research within non-Western medical education contexts. While many investigations document high distress among medical trainees (1, 2), few have tested mediation models explaining why strengths lead to better outcomes. Our findings suggest that strengths-based curricula—which teach students to identify and apply their signature strengths—could simultaneously foster resilience and flourishing. Concrete applications could include structured "signature strengths workshops" during orientation, peer-mentoring programs that emphasize appreciation of others' strengths, and brief reflective writing assignments that link personal strengths to clinical challenges. Embedding these modules into core professionalism or clinical reasoning courses would enable students to practice strengths use within authentic learning contexts, enhancing both psychological and academic outcomes (13, 14). This study provides a novel contribution to the literature in two important ways. First, to our knowledge, it represents the first empirical test of a structural equation mediation model linking character strengths, resilience, and flourishing among Iranian medical students. Second, it integrates multiple theoretical frameworks within positive psychology—specifically, the broaden-and-build theory of positive emotions, the character strengths approach, and resilience theory—to explain the dynamic mechanisms through which personal strengths translate into enduring well-being. By combining these perspectives within a single analytical model, the present research advances a more comprehensive understanding of flourishing in educational contexts characterized by high psychological demands.

Despite its contributions, several methodological limitations should be considered more explicitly. First, the cross-sectional design precludes causal inference. Although mediation analysis provides insight into indirect pathways, longitudinal or experimental studies are needed to confirm directionality. Future research should employ prospective designs or randomized controlled trials of strength interventions to establish causality. Second, employing self-report instruments may give rise to common method bias and social desirability effects, particularly considering the ethically positive nature of constructs such as "character strengths." Future research could triangulate self-reports with behavioral or observer-based assessments (e.g., peer evaluations of strengths use or resilience behaviors). Third, the single-institution sample limits generalizability, as the participants were recruited from one Iranian medical school. Cultural factors, including norms around hierarchy, collectivism, and mental health stigma in Iran could influence the observed relationships; replication in diverse contexts (e.g., other Middle Eastern, or low resource settings) would clarify cross-cultural applicability. Fourth, the exclusive use of self-report instruments introduces potential issues related to common method variance and social desirability bias. Incorporating mixed methods approaches—such as peer ratings of observed strengths or qualitative interviews—could mitigate bias and enrich understanding of how students enact strengths and resilience in real-world settings.

Building on our results, future studies could (a) implement and evaluate strengths-based interventions (e.g., signature-strengths workshops) with pre-post assessments of resilience and flourishing; (b) conduct subgroup analyses to examine whether certain strengths are especially potent mediators; (c) explore organizational factors (e.g., faculty autonomy support, peer mentoring programs) as moderators of the strengths–resilience pathway, guided by Self-Determination Theory (34) and Social-Ecological Resilience Theory (33); and (d) integrate physiological or behavioral indicators of stress and coping to triangulate self-report findings.

Conclusion

In summary, this study contributes to a deeper understanding of how and why medical students flourish despite stress. By revealing how resilience mediates the impact of strengths on well-being, our findings suggest that educational interventions should go beyond stress management and incorporate strengths-based components into the curriculum. Specifically, structured programs such as signature-strengths workshops, resilience-building modules, or reflective writing exercises on personal strengths could be embedded into orientation programs or longitudinal professionalism courses. At the institutional level, medical schools might also integrate strength-based mentorship systems, where faculty advisors help students align clinical learning goals with personal strengths, or implement resilience rounds for group reflection during demanding rotations. These applied strategies are not only low-cost and scalable but also contextually sensitive to the challenges of medical education in non-Western settings. Faculty development initiatives can also train instructors to

recognize and reinforce students' character strengths during feedback, mentoring, and clinical supervision. These applied strategies are low-cost, scalable, and well-aligned with existing competency frameworks in medical education. Ultimately, integrating strengths-based practices may help mitigate burnout risk and enhance students' adaptive capacity, well-being, and long-term professional identity formation.

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Conflict of interests: There is no conflict of interest.

Ethical approval: This study received ethical approval under the code IR.KAUMS.REC.1403.022. Participation was voluntary, and all students were informed about the study's purpose and procedures. Informed consent was obtained after assuring participants of the confidentiality of their responses.

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