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Self-compassion as a mediator between insight, self-reflection, and social anxiety in medical students: a path analysis

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Abstract

Background & Objective: Medical sciences students are often exposed to educational and clinical situations that involve observation, evaluation, communication, and performance. These situations may be challenging for students with Social Anxiety Disorder (SAD), which is characterized by fear of negative evaluation and avoidance of social or performance situations. The present study aimed to investigate the relationship between self-compassion, self-reflection, insight, and social anxiety among medical sciences students with SAD, focusing on the mediating role of self-compassion.

Materials & Methods: This descriptive study employed path analysis. The study population consisted of medical sciences students with SAD. A total of 130 participants were selected through convenience sampling after completing a screening questionnaire. Eligible participants then underwent structured clinical interviews, and the diagnosis of SAD was confirmed using SCID-I and SCID-II. Data were analyzed using Pearson correlation and path analysis with SPSS/AMOS version 26.

Results: The findings showed that insight had a significant direct effect on self-compassion ($\beta = 0.33$, $p = 0.002$) and social anxiety ($\beta = -0.19$, $p = 0.008$). Self-compassion also mediated the relationship between self-reflection and social anxiety ($\beta = 0.13$, $p = 0.005$), as well as the relationship between insight and social anxiety ($\beta = -0.16$, $p = 0.004$). Overall, the results indicated that self-compassion played an important mediating role in the proposed model.

Conclusion: The findings suggest that self-reflection and insight may influence social anxiety through self-compassion among medical sciences students. Since social anxiety can affect students' participation in educational and clinical settings, strengthening self-compassion may be useful in supporting students' adaptation to learning environments and improving their educational functioning.

Keywords: student, medical; social anxiety disorder; compassion; self concept; path analysis

Introduction

Medical sciences students are frequently exposed to educational and clinical situations that require communication, observation, evaluation, and performance. These situations include presentations, clinical encounters, and performance-based assessments, which are essential parts of medical education but may also create psychological pressure for students. Social Anxiety Disorder (SAD) involves excessive fear of negative evaluation and avoidance of social or performance situations that interfere with daily functioning. SAD is notably common among university students, and medical students may be particularly vulnerable due to frequent evaluative situations within academic and clinical training environments.

Evidence suggests a considerable burden of social anxiety symptoms in medical training contexts. For

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example, among medical students in an Iranian medical university, 58.9% were reported to have moderate-to-very severe social phobia symptoms based on Social Phobia Inventory (SPIN) severity categories [1]. This disorder is one of the most common anxiety problems, with a lifetime clinical prevalence estimated at 8.4% [2]. Findings also indicate that experiencing social anxiety constitutes a risk factor associated with harmful outcomes such as alcohol use problems [3] and suicidal ideation [4]. According to a study by

Norouzi et al. [5], the prevalence of social anxiety among students at Urmia University was reported as 2.5%. Furthermore, undergraduate students exhibited higher levels of social anxiety compared to graduate and doctoral students.

These findings show that social anxiety is not only a clinical issue, but also a relevant concern in university education, especially in programs where students are repeatedly exposed to social, academic, and performance-based demands. Given the high academic pressure and social demands placed on medical students, understanding the prevalence and correlates of SAD in this specific population is critical for designing effective intervention strategies and student support programs in medical education settings. According to a study by Mohammadi et al., the lifetime prevalence of social anxiety disorder among Iranian children and adolescents aged 6–18 years was reported to be 1.8% [6].

Among the various causes of SAD, cognitive factors—particularly self-reflection, insight, and self-compassion—have recently gained attention as key explanatory constructs [7]. Self-reflection (monitoring and evaluating one's thoughts, feelings, and behaviors) and insight (an individual's ability to gain clarity in understanding internal states and behaviors) are identified as forms of self-focused awareness [8]. In medical sciences students, these self-related processes may influence how students interpret feedback, evaluate their performance, and respond to challenging educational or clinical situations. Previous research has identified associations between self-reflection and insight and psychological outcomes such as resilience [9], well-being, and psychological symptoms [10].

The relationship between self-reflection and social anxiety lies in self-focused attention, manifested as awareness of self-referential and internally generated information [7], which individuals often encounter in social anxiety because it is responsible for increased processing of negative thoughts before, during, and after a social situation [11–13]. In educational contexts, this may appear during classroom participation, presentations, oral examinations, communication with instructors, or clinical encounters. Under self-focused attention, self-reflection may intensify rumination and distress, leading to greater social anxiety. However, when directed toward self-improvement, it can make social experiences less harmful. Research also shows that high self-reflection is linked to increased anxiety and depression, while greater insight serves as a buffer against emotional difficulties [7]. Therefore, insight may help students understand their emotional and behavioral reactions more clearly and adapt more effectively to evaluative learning environments.

Consistent with self-reflection and insight, findings also indicate that self-compassion is an effective factor in SAD that can be considered in its assessment and treatment [14, 15]. Self-compassion refers to responding to oneself with kindness rather than harsh self-criticism when experiencing failures or falling short of personal standards [20]. It comprises three components: self-kindness versus self-judgment, common humanity versus isolation, and mindfulness versus over-identification [20]. This construct may be especially relevant in medical education, where students commonly face feedback, comparison with peers, academic pressure, and concerns about making mistakes in clinical or practical situations.

In general, people who show greater self-compassion are less likely to exhibit anxiety-related symptoms, while adults diagnosed with SAD score lower on self-compassion compared with their nonclinical peers. Indeed, high self-compassion may act as a protective factor and has been associated with lower levels of anxiety in both cross-sectional and longitudinal studies [16]. Meta-analyses have also shown that self-compassion, regardless of clinical status, gender, or age, is associated with psychopathology [17]. Because self-compassion can act as a buffer against psychological distress and discomfort, increasing self-compassion may be beneficial for individuals with social anxiety [18]. Werner et al. also observed that adults diagnosed with SAD reported lower levels of self-compassion compared to nonclinical individuals; this finding remained significant after controlling for depression and generalized anxiety [19].

Research indicates that self-compassion is linked to various psychological factors and processes underlying social anxiety [18]. Gill et al. [18] found an inverse relationship between self-compassion and social anxiety in adolescents. Similarly, Stefan and Cheie reported that

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higher self-compassion reduces social anxiety, while low self-compassion combined with high self-reflection increases it; in contrast, higher levels of self-compassion and insight may function as protective factors against social anxiety [7]. These findings suggest that self-compassion may explain how self-reflection and insight are related to social anxiety, particularly in students who are exposed to frequent evaluation and performance demands.

Despite the high prevalence of social anxiety among medical students, the underlying psychological mechanisms contributing to social anxiety in this population remain insufficiently explored, particularly using structural equation modeling. Moreover, limited evidence exists regarding the mediating role of self-related cognitive processes in Iranian medical students. Therefore, the present study aimed to address these gaps by examining a comprehensive model of social anxiety among medical sciences students with SAD using advanced statistical approaches and focusing on the mediating role of self-compassion in the relationship between self-reflection, insight, and social anxiety.

Materials & Methods

Design and setting(s)

The present study used a descriptive, cross-sectional design and path analysis. The statistical population consisted of students at Zanjan University of Medical Sciences, from whom 130 participants were selected using convenience sampling. Data collection was conducted from September 23, 2023, to December 23, 2023.

Participants and sampling

The required sample size was estimated using G*Power version 3.1 with a significance level of $\alpha = 0.05$, a statistical power of 0.90, and an expected large effect size ($f = 0.42$). The selected effect size was based on previous evidence demonstrating a strong negative association ($r \approx -0.55$) between self-compassion and social anxiety, corresponding to a large effect size according to Cohen's guidelines [18, 21]. The required sample size was estimated to be 130 participants, which was achieved in the present study.

Participants were recruited from two complementary sources. The first source consisted of medical sciences students who responded to a public invitation disseminated through university social media platforms, including student groups and communication channels. An online screening questionnaire was developed using the Porsline platform, and the survey link was distributed electronically. Students who agreed to participate completed the screening questionnaire online.

The second recruitment source included students who attended the university counseling centers during the study period. These students were informed about the study by counseling center staff and, if willing to participate, completed the same screening questionnaire in a paper-and-pencil format. Therefore, all participants, regardless of their recruitment source, underwent the same initial screening procedure before being considered for diagnostic assessment.

Overall, 733 students completed the screening questionnaire, including 642 students recruited through the online public invitation and 91 students recruited from university counseling centers. Following data quality assessment, 38 questionnaires (34 online and 4 paper-and-pencil questionnaires) were excluded because of incomplete responses or invalid response patterns (e.g., selecting the same response option for all questionnaire items). Consequently, 695 valid screening questionnaires remained for eligibility assessment. The participant recruitment and selection process is presented in **Figure 1**.

Students who scored above the predetermined screening cut-off point (n = 207) were considered eligible for further diagnostic evaluation. These participants were contacted by telephone and invited to attend a face-to-face clinical interview. Nineteen individuals either declined further participation, could not be contacted after repeated attempts, or failed to attend the scheduled interview session. Consequently, 188 participants completed the Structured Clinical Interview for DSM-IV Axis I Disorders (SCID-I). SCID-I was administered to confirm the diagnosis of SAD and to assess major psychiatric disorders. During this stage, 29 participants did not meet the diagnostic criteria for SAD and were excluded. The remaining 159 participants subsequently completed the Structured Clinical Interview for DSM-IV Axis II Personality Disorders (SCID-II) to evaluate personality disorders and other exclusion criteria. Following the SCID-II assessment, 12 participants were excluded because they met the diagnostic criteria for Avoidant Personality Disorder, while an additional 6 participants were excluded because of other exclusionary psychiatric conditions specified in the study protocol. This process resulted in 141 eligible participants. After providing written informed consent, eligible participants completed the demographic information form, including age, sex, and educational level, followed by the study

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questionnaires. During data collection, 11 participants either withdrew from the study or failed to complete the questionnaires. Therefore, the final sample consisted of 130 participants, whose data were included in the path analysis.

Inclusion criteria were: (1) a confirmed diagnosis of Social Anxiety Disorder based on SCID-I; (2) absence of severe psychiatric disorders according to SCID-I and SCID-II assessments; (3) willingness to participate in the study; and (4) age between 18 and 50 years. Exclusion criteria included: (1) incomplete questionnaires or invalid/random response patterns during the initial screening; (2) failure to meet the diagnostic criteria for Social Anxiety Disorder during the SCID-I interview; (3) diagnosis of Avoidant Personality Disorder or other exclusionary psychiatric disorders during the SCID-II interview; and (4) withdrawal from the study or failure to complete the study questionnaires. All study data were collected using standardized and validated instruments described in the following section.

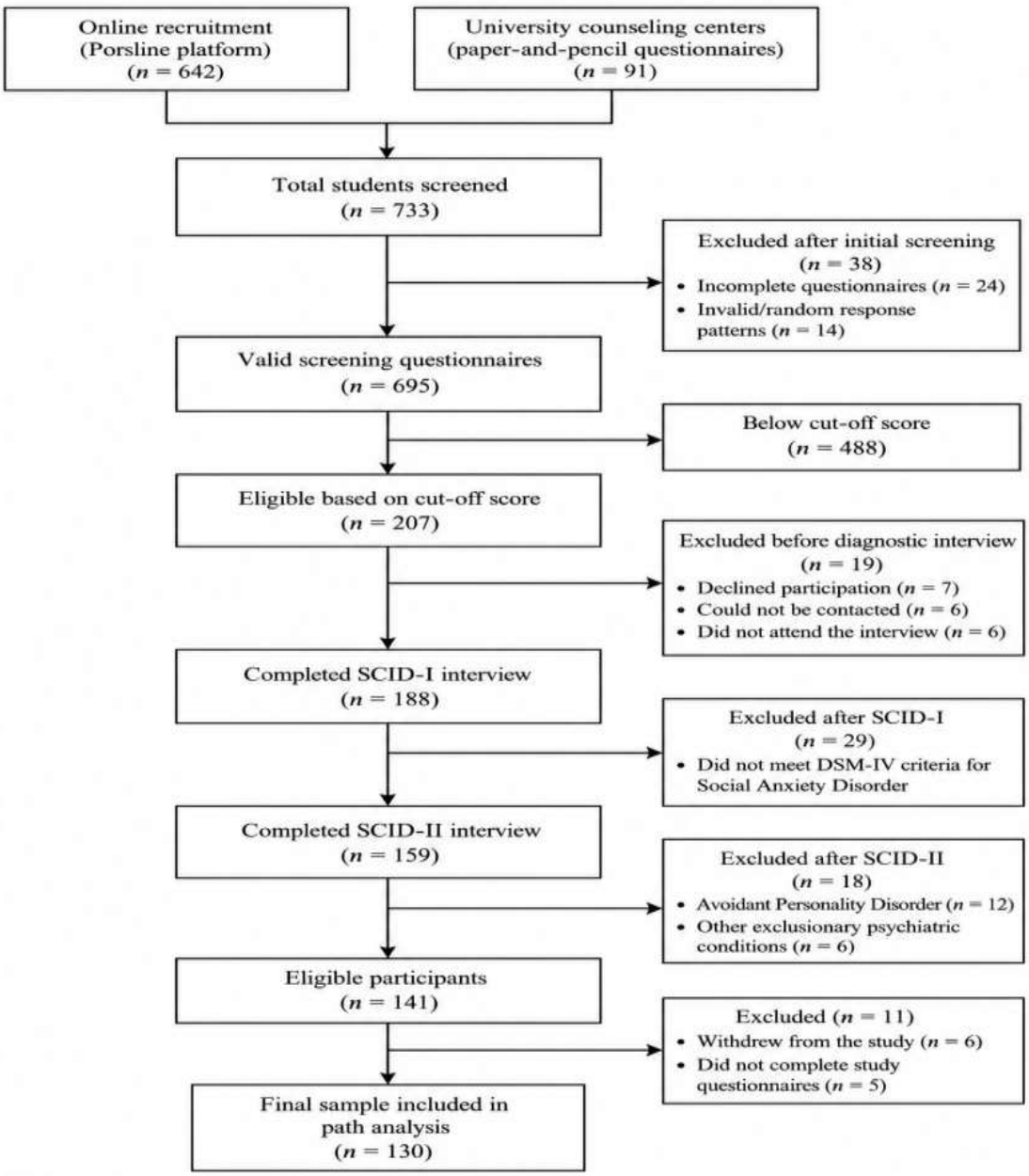

Figure 1. Flow diagram of participant recruitment and selection

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Tools/Instruments

All self-report instruments used a Likert-type scale, with higher scores indicating greater levels of the construct measured.

Liebowitz Social Anxiety Scale (LSAS): Developed by Liebowitz, the LSAS evaluates a wide range of social situations that may be problematic for individuals with social anxiety. It contains 24 items across two subscales: performance anxiety (13 items) and social situation anxiety (11 items), yielding total and subscale scores. Scores are interpreted as mild (55–65), moderate (65–80), severe (80–95), and very severe (> 95). The self-report version of the LSAS demonstrated satisfactory construct and convergent validity, and its factor structure was confirmed. The scale also showed high reliability, with a Cronbach's alpha coefficient of 0.95 for the total score and coefficients ranging from 0.90 to 0.94 for the subscales, indicating excellent internal consistency [22]. Khoshouei's [23] study on the Persian version of the LSAS conducted a principal factor analysis and extracted five factors that explained 84.68% of the total variance. The Cronbach's alpha coefficients for the total scale and its subscales were reported to be satisfactory, and the test–retest reliability was also found to be acceptable. Therefore, the Persian version of the LSAS was recognized as having acceptable reliability and structural validity.

Self-Reflection and Insight Scale (SRIS): Developed by Grant et al. [8], the SRIS assesses private self-awareness necessary for behavioral change. It has 20 items across two factors (self-reflection and insight), accounting for about 56% of the variance. According to Grant et al., factor analytic findings supported the construct validity of the Self-Reflection and Insight Scale by confirming two distinct factors, self-reflection and insight. Test–retest reliability over a seven-week interval was acceptable, with coefficients of 0.77 for the Self-Reflection subscale and 0.78 for the Insight subscale, indicating adequate temporal stability of the instrument [8].

Naeimi et al. [24] translated the SRIS using a standard procedure and confirmed its content validity through expert review. They reported a weak confirmatory factor analysis but, through exploratory factor analysis, extracted a four-factor model that accounted for 56.8% of the variance. In this study, the overall Cronbach's alpha coefficient for the scale was 0.87, and the Intraclass Correlation Coefficient (ICC) for test–retest reliability was 0.79.

Self-Compassion Scale (SCS): Developed by Neff, the SCS comprises 26 items across six subscales: self-kindness, self-judgment, common humanity, isolation, mindfulness, and over-identification. The original scale demonstrated good internal consistency, with a Cronbach's alpha of approximately 0.90, and test–retest reliability of approximately 0.93 [20]. Azizi et al. evaluated the psychometric properties of the Iranian version of the SCS in a sample of 265 university students. Internal consistency was acceptable, with Cronbach's alpha coefficients of 0.78 for the total scale and 0.79–0.93 for the subscales. Construct validity was supported by confirmatory factor analysis (CFA), which confirmed the six-factor structure of the SCS (RMSEA = 0.08, NFI = 0.86, CFI = 0.90). Correlations with related measures (RSS, RRS, BDI-II, and STAI) indicated satisfactory convergent and discriminant validity [25].

Structured Clinical Interview for DSM Axis I (SCID-I): A structured interview to diagnose DSM Axis I disorders with high reliability and validity [26].

Structured Clinical Interview for DSM Axis II (SCID-II): A semi-structured interview for diagnosing Axis II personality disorders, widely used with good interrater reliability [27].

Data collection methods

After screening and application of inclusion/exclusion criteria, structured interviews (SCID-I and SCID-II) were conducted to confirm diagnostic eligibility. Participants who met criteria and provided informed consent completed demographic questions and the LSAS, SCS, and SRIS questionnaires. Completed questionnaires were reviewed and only fully completed, nonrandom responses were retained.

Data analysis

A total of 130 completed questionnaires met the inclusion/exclusion criteria and constituted the final dataset. Data were analyzed using SPSS version 26 and AMOS version 26 for Pearson correlations and path analysis. Model fit was evaluated using several goodness-of-fit indices, including the Chi-square to degrees of freedom ratio (χ^2/df), the Goodness of Fit Index (GFI), the Normed Fit Index (NFI), the Comparative Fit Index (CFI), the Incremental Fit Index (IFI), and the Root Mean Square Error of Approximation (RMSEA). Based on conventional cutoff criteria, values of $\chi^2/df \leq 3$, GFI, NFI, CFI, and IFI ≥ 0.90, and RMSEA ≤ 0.08 were considered indicative of an acceptable model fit.

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Results

The demographic characteristics of the study participants are presented in **Table 1**. The final sample consisted of 130 university students with a mean age of 23.72 years (SD = 3.75). Participants were recruited from several faculties, including Medicine, Nursing and Midwifery, Health Sciences, Dentistry, Pharmacy, and Paramedical Sciences. The sample included both undergraduate and graduate students and participants recruited through online public invitations and university counseling centers.

As presented in **Table 2**, anxiety, avoidance, and total social anxiety scores were strongly and positively intercorrelated (r = 0.91–0.97, all $p < 0.01$). Total social anxiety demonstrated a significant negative correlation with self-compassion (r = -0.54, $p < 0.01$) and insight (r = -0.28, $p < 0.01$), whereas its correlation with self-reflection was not statistically significant (r = -0.05, $p > 0.05$). Insight was positively associated with self-reflection (r = 0.59, $p < 0.01$) and negatively associated with self-compassion (r = -0.17, $p < 0.05$).

In addition to the bivariate correlation analysis, path analysis was performed using the maximum likelihood estimation method to examine the fit of the proposed conceptual model. Before estimating the structural model, the assumptions underlying path analysis were evaluated. Univariate normality was assessed using the Kolmogorov–Smirnov test, and the results did not indicate significant deviations from normality for the study variables (all $p > 0.05$; **Table 2**).

Table 1. Demographic characteristics of the study participants (n = 130)

Variable	Category	Value	n (%)
Age (years)	Mean ± SD	23.72 ± 3.75	—
	≤ 20 years	—	24 (18.5)
	21–25 years	—	65 (50.0)
	≥ 26 years	—	41 (31.5)
Gender	Male	—	48 (36.9)
	Female	—	82 (63.1)
Educational level	Undergraduate	—	91 (70.0)
	Graduate (MSc/PhD)	—	39 (30.0)
Faculty	Medicine	—	32 (24.6)
	Nursing & midwifery	—	35 (26.9)
	Health sciences	—	24 (18.5)
	Dentistry	—	18 (13.8)
	Pharmacy	—	12 (9.2)
	Paramedical sciences	—	9 (6.9)
Recruitment source	Online (Porsline)	—	70 (53.8)
	University counseling centers	—	60 (46.2)
Total	Participants	—	130 (100)

Note: Descriptive statistics were used to summarize demographic characteristics of the participants.
Abbreviations: SD, standard deviation; n, number of participants.

Table 2. Descriptive statistics, normality tests, and Pearson correlations among study variables

Variable	Mean	SD	K–S	Anxiety	Avoidance	Social anxiety	Self-compassion	Self-reflection	Insight
Anxiety	32.16	17.14	0.09	1	0.91**	0.97**	-0.54**	–0.06	-0.23**
Avoidance	25.33	15.17	0.15	0.91**	1	0.97**	-0.51**	–0.05	-0.32**
Social anxiety (Total)	57.50	32.16	0.11	0.97**	0.97**	1	-0.54**	–0.05	-0.28**
Self-compassion	36.78	8.55	0.29	-0.54**	-0.51**	-0.54**	1	–0.06	0.17*
Self-reflection	43.16	6.00	0.20	-0.06	-0.05	-0.05	-0.06	1	0.59**
Insight	31.50	5.24	0.20	-0.23**	-0.32**	-0.28**	0.17*	0.59**	1

Note: K–S = Kolmogorov–Smirnov test. *p < 0.05; **p < 0.01.
Abbreviations: SD, standard deviation.

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Multivariate normality was examined using the Mahalanobis distance, and multicollinearity was assessed using tolerance and Variance Inflation Factor (VIF) indices. The results indicated that the assumptions required for path analysis were adequately met.

As shown in **Table 3**, the initial structural (**Figure 2**)model demonstrated acceptable values for several incremental fit indices (GFI = 0.92, NFI = 0.95, CFI = 0.96, and IFI = 0.92). However, the RMSEA value (.17) indicated inadequate overall model fit despite an acceptable χ^2/df ratio (2.86). Therefore, the non-significant direct path from Self-Reflection to Social Anxiety was removed, and the model was re-specified. This was the only modification made to the hypothesized model; no additional structural paths, correlated error terms, or covariance parameters were introduced. All remaining paths were retained as originally hypothesized, and the revised model was subsequently re-estimated. As shown in **Figure 3**, the final structural model explained 33% of the variance in Social Anxiety (R^2 = 0.328). This indicates that insight, self-reflection, and self-compassion jointly accounted for approximately one-third of the variance in social anxiety among the participants.

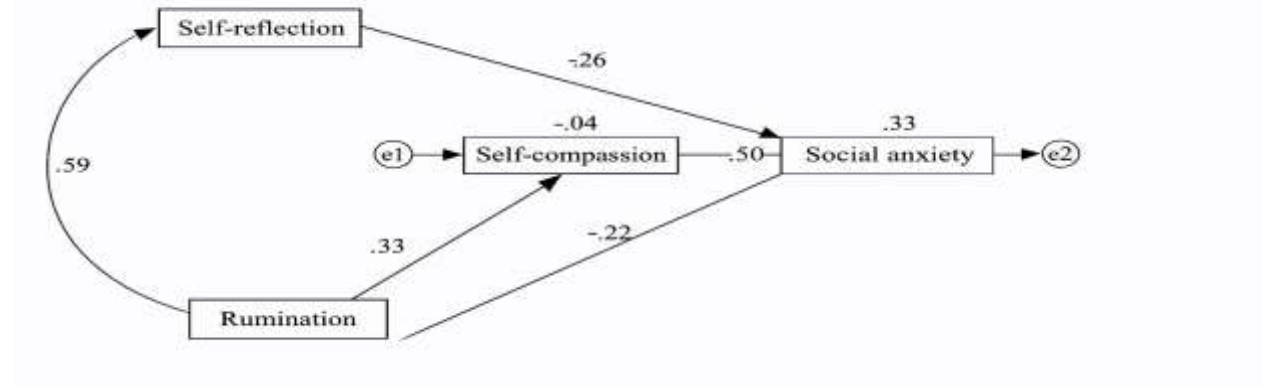

Figure 2. Initial structural model of social anxiety based on self-reflection and insight with the mediating role of self-compassion.

Table 3. Goodness-of-fit indices for the initial and final structural models

Fit Index	Recommended value	Initial model	Final model	Interpretation
χ^2/df	≤ 3.00	2.86	0.17	Acceptable
RMSEA	≤ 0.08	0.17	0.03	Improved
GFI	≥ 0.90	0.92	1.00	Improved
NFI	≥ 0.90	0.95	1.00	Improved
CFI	≥ 0.95	0.96	1.00	Improved
IFI	≥ 0.90	0.92	1.00	Improved

Note: Goodness-of-fit indices were used to evaluate the initial and final structural equation models.
Abbreviations: χ^2/df, chi-square divided by degrees of freedom; RMSEA, root mean square error of approximation; GFI, goodness-of-fit index; NFI, normed fit index; CFI, comparative fit index; IFI, incremental fit index.

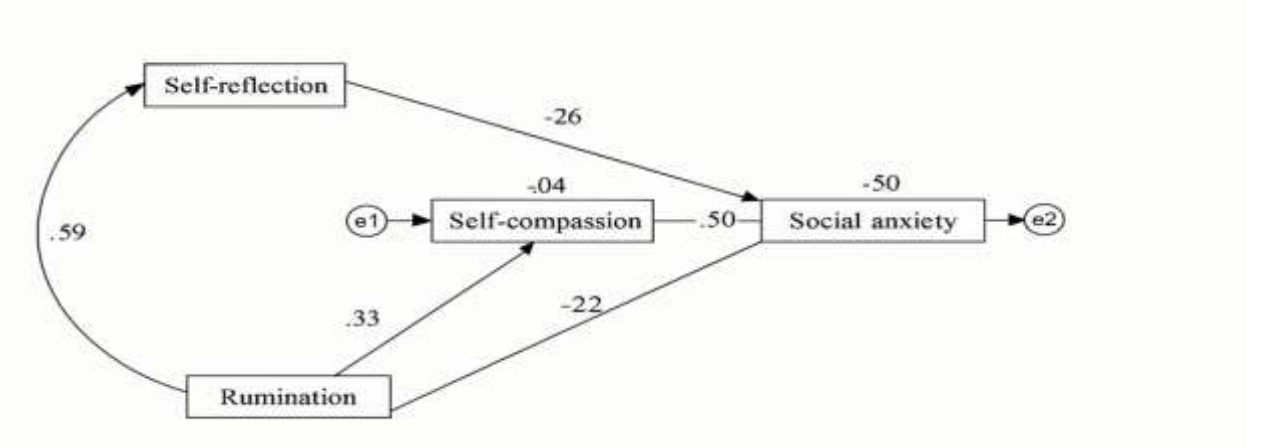

Figure 3. Final structural model of social anxiety based on self-reflection and insight with the mediating role of self-compassion.

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The standardized direct and indirect effects estimated in the final structural model are presented in **Table 4**. Insight had a significant positive direct effect on self-compassion ($\beta = 0.33$, $p = 0.002$), whereas self-reflection had a significant negative direct effect on self-compassion ($\beta = -0.25$, $p = 0.014$). Furthermore, insight exerted a significant negative direct effect on social anxiety ($\beta = -0.19$, $p = 0.008$), while self-compassion demonstrated a significant negative direct effect on social anxiety ($\beta = -0.50$, $p = 0.001$), indicating that higher levels of insight and self-compassion were associated with lower levels of social anxiety.

The indirect effects were evaluated using the bootstrap method. The indirect effect of self-reflection on social anxiety through self-compassion was statistically significant ($\beta = 0.13$, $p = 0.005$). Similarly, insight exerted a significant indirect effect on social anxiety through self-compassion ($\beta = -0.16$, $p = 0.004$), supporting the mediating role of self-compassion in the relationships between self-reflection, insight, and social anxiety.

Discussion

The present study aimed to examine the mediating role of self-compassion in the relationship between self-reflection, insight, and social anxiety among medical sciences students with SAD. The findings indicated that insight and self-reflection, through the mediating role of self-compassion, significantly contributed to the prediction of social anxiety. The final structural model explained 32.8% of the variance in social anxiety ($R^2 = 0.328$), indicating that these variables collectively accounted for approximately one-third of the variability in social anxiety among the participants. Nevertheless, approximately 67.2% of the variance remained unexplained, suggesting that other psychological, interpersonal, and environmental factors may also contribute to social anxiety and should be investigated in future research. However, contrary to insight and self-compassion, the direct effect of self-reflection on social anxiety was not significant. These findings are important in the context of medical education, because social anxiety may affect students' participation in educational activities, clinical communication, presentation skills, and adaptation to evaluative learning environments.

A review of previous studies indicates that the current findings are generally consistent with earlier research [28]. Consistent with the present findings, the direct effect of self-compassion on social anxiety is negative, which aligns with studies by [18, 7, 28]. In most studies, higher levels of self-compassion are associated with lower levels of social anxiety, which may be due to the maintenance of mindful awareness, allowing individuals to accept negative emotions and thoughts without attempting to change or avoid them [28]. For medical sciences students, this may be especially relevant in situations such as oral presentations, clinical encounters, peer discussions, and performance-based assessments, where fear of negative evaluation can interfere with active learning.

Avoidance is a phenomenon that, in most emotional issues, particularly social anxiety, is considered a factor in the persistence of the disorder. In fact, avoidance of unpleasant situations and emotions, which can also manifest as emotional suppression, is recognized as part of "ineffective safety-seeking behaviors" in cognitive-behavioral models of social anxiety [29, 30]. In medical education settings, these avoidance behaviors may appear as reluctance to ask questions, avoidance of presentations, reduced participation in clinical discussions, or hesitation in communicating with patients and instructors. On the other hand, when individuals exhibit compassionate behaviors toward themselves, they are mindful and show fewer avoidance reactions, and may experience fewer symptoms of anxiety [16]. Furthermore, previous research has explored the role of self-compassion in reducing negative emotions, such as social anxiety, through its components of self-kindness, mindfulness, common humanity, and reduced self-judgment and over-identification [28]. The findings also suggest that negative self-judgment and feelings of isolation are key factors influencing anxiety in interactions with individuals with Social Anxiety Disorder [7].

The present findings suggest that greater self-compassion is associated with less self-criticism and avoidance in response to academic mistakes, feedback, and social evaluation among medical sciences students.

Other findings of the study revealed both direct and indirect effects of insight on social anxiety, which align with previous research. Several studies have reported a positive correlation between insight and psychological constructs such as resilience [9], mindfulness [31], psychological well-being, and life satisfaction [10]. Additionally, some studies have pointed to a negative relationship between insight and detrimental constructs such as depression, anxiety, negative emotions, and rumination [7, 9, 11], which implicitly supports the present findings. In the educational context, insight may help students recognize their emotional reactions during

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stressful academic and clinical experiences and understand how these reactions influence their behavior. Regarding the direct effect of insight on social anxiety, an individual's ability to clearly understand their emotions, thoughts, and behaviors may lead to a better understanding of their causes and consequences and facilitate the use of appropriate and adaptive emotion-regulation strategies. Previous research has supported the role of insight in decision-making [32] and highlighted the harmful effects of ineffective emotion-regulation strategies in emotional difficulties, particularly social anxiety [33]. Furthermore, when insight is accompanied by high self-compassion, greater emotional understanding and clarity may be associated with less negative evaluation, self-blame, and self-criticism in response to unpleasant social experiences. In other words, positive attributional and interpretive styles may reduce engagement in maladaptive cognitive and emotional processes and consequently reduce reliance on safety-seeking behaviors such as avoidance and emotional suppression. Previous studies have also highlighted the relevance of attributional and positive interpretive styles to emotional difficulties [34, 35]. These findings suggest that insight may be beneficial, particularly when students are also able to respond to themselves with compassion rather than harsh self-judgment.

Finally, the direct effect of self-reflection on social anxiety was not significant, although its indirect effect through self-compassion was significant. This finding is consistent with previous research. This lack of a significant direct association may reflect the context-dependent nature of self-reflection, as self-reflection is not necessarily adaptive or maladaptive in itself [7, 9, 11]. For example, Stefan and Cheie did not report a significant correlation between self-reflection and social anxiety [7], which aligns with the results of [9], showing no relationship between self-reflection and stress. Regarding the lack of significance, it can be suggested that self-reflection may be a transdiagnostic construct, with very high or low levels of it being associated with psychological pathology, while moderate levels support normal social and emotional functioning [36]. Accordingly, adaptive self-reflection may involve a balanced and constructive examination of one's thoughts, emotions, and behavior, whereas maladaptive self-reflection may involve repetitive, judgmental, and self-critical thinking.

As seen in the present study, a significant relationship was observed between self-compassion and self-reflection. In medical education, self-reflection is generally considered valuable for learning and professional development; however, when it is accompanied by excessive self-criticism, it may become less adaptive and may increase emotional pressure. Therefore, the consequences of self-reflection may depend not only on how frequently students examine their experiences, but also on the manner and emotional context in which this process occurs.

Additionally, self-reflection in its extreme forms may manifest as rumination or worry, and its association with psychological distress may vary according to an individual's level of self-compassion. When individuals focus extensively on their thoughts and emotions, this process may become maladaptive, particularly when accompanied by low self-compassion and high self-criticism [7].

In such circumstances, self-reflection may function as a vulnerability factor because personal experiences are examined within a harsh and judgmental emotional context. However, when self-reflection is accompanied by high self-compassion, individuals may respond to themselves more compassionately, which may limit the potentially harmful consequences of excessive self-reflection. Research also indicates that self-reflection accompanied by positive self-evaluation can contribute to psychological well-being [37]. Thus, self-reflection may have a more protective role when it promotes understanding and positive self-evaluation rather than rumination and harsh self-judgment.

Overall, the findings of the present study suggest that self-compassion may be an important mechanism linking insight and self-reflection to social anxiety. These results indicate that educational programs should not focus only on students' academic achievement, but also consider the emotional and cognitive processes that affect their learning experiences.

Conclusion

In conclusion, the findings of the present study indicate that insight and self-reflection were associated with social anxiety through indirect pathways involving self-compassion, and together these variables explained 32.8% of the variance in social anxiety among medical sciences students with social anxiety disorder. These findings support the proposed structural model and highlight the potential role of self-compassion in understanding the relationships among insight, self-reflection, and social anxiety within the study population.

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Ethical considerations

This research proposal was approved by the Ethics Committee of Zanjan University of Medical Sciences with the code IR.ZUMS.REC.1402.148, and all ethical considerations were adhered to in its execution.

Artificial intelligence utilization for article writing

Artificial intelligence tools were used only for language editing of the manuscript. The authors reviewed and approved all AI-assisted edits and remain fully responsible for the content of the article.

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Conflict of interest statement

The authors declare that there is no potential conflict of interest.

Author contributions

EM was responsible for the study design. BT, NA, and EK contributed to writing the article, while GhA was responsible for data analysis. EM also conducted the critical revision of the manuscript and provided final approval for publication.

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Data availability statement

The findings of this study are reported in the article based on the analyses described in the Methods section. No separate dataset accompanies this publication.

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