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Exploring Interpersonal Communication Challenges and their Relationship with Academic Burnout among Medical Sciences Students: A Sequential Explanatory Mixed-Methods Study

Shahrbanoo Karimi-Emamverdikhan[1] (PhD)

1. Department of Psychology, Sari Branch, Islamic Azad University, Sari, Iran

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Corresponding Author:
Shahrbanoo Karimi-Emamverdikhan,
Department of Psychology,
Sari Branch,
Islamic Azad University,
Sari,
Iran
E-mail: karimimaryam294@gmail.com

Abstract

Introduction: Limited evidence has examined interpersonal problems and academic burnout using a sequential explanatory mixed-methods design. This study examined their association and used qualitative findings to explain quantitative results.

Method: In this sequential explanatory mixed-methods study, 350 medical sciences students were selected using stratified random sampling. Participants completed the Inventory of Interpersonal Problems (IIP-32) and Maslach Burnout Inventory–Student Survey (MBI-SS). Quantitative data were analyzed using Pearson's correlation and multiple linear regression. Subsequently, 20 students with the highest and lowest burnout scores participated in semi-structured interviews. Qualitative data were analyzed thematically and integrated with quantitative findings.

Results: Interpersonal problems were positively correlated with academic burnout ($r = 0.58$, $P < 0.001$). Low assertiveness (standardized $\beta = 0.29$), social avoidance (standardized $\beta = 0.24$), and interpersonal difficulties (standardized $\beta = 0.18$) were significantly associated with burnout; the model explained 36% of its variance ($R^2 = 0.36$, $P < 0.001$). Five qualitative themes explained these associations: fear of being judged, unresolved peer conflicts, communication distance from faculty, burnout related to educational interactions, and the need for communication skills training.

Conclusion: Interpersonal problems are associated with academic burnout among medical sciences students. Communication skills, assertiveness, and conflict-management training may have practical value in medical education. Longitudinal and intervention-based studies are needed to evaluate their effectiveness.

Keywords: Interpersonal Relations, Burnout, Psychological, Students, Health Occupations, Communication, Medical Education

Introduction

Interpersonal communication is one of the fundamental components of professional competence in medical sciences and plays a pivotal role in learning, educational interactions, teamwork, clinical decision-making, and the delivery of safe, high-quality patient care [1]. From the early years of their education, medical sciences students are required to establish effective communication with classmates, faculty members, healthcare staff, patients, and their families [2]. Effective communication can enhance learning and academic performance and may facilitate trust, empathy, collaboration, and satisfaction with the educational environment [3]. Conversely, interpersonal communication problems may be associated with misunderstandings, interpersonal conflicts, social isolation, reduced social support, and diminished academic performance, which may be accompanied by poorer mental health [4].

Medical sciences education is characterized by intensive academic demands, a high volume of coursework, competitive learning environments, clinical placements, and frequent

exposure to stressful situations [5]. Consequently, medical students are at greater risk of psychological distress than many other university populations [6]. Within this context, the quality of interpersonal relationships becomes particularly important, as supportive relationships may serve as protective factors against stress [7], whereas interpersonal conflicts, feelings of social rejection, difficulties in communicating with faculty or peers, and inadequate emotional regulation may be associated with greater perceived stress [8]. Recent studies have also demonstrated that the quality of social interactions and communication skills is associated with mental health, academic satisfaction, and psychological adjustment among medical sciences students [9–11].

One of the significant consequences associated with prolonged academic stress is academic burnout [12]. Academic burnout is a multidimensional syndrome characterized by emotional exhaustion, cynicism or detachment toward academic activities, and a reduced sense of academic efficacy [13]. This condition has been associated with numerous adverse outcomes, including reduced motivation, poorer academic performance, increased class absenteeism, impaired learning quality, mental health problems, and even withdrawal from academic programs [14–16]. Recent systematic reviews have reported that the prevalence of burnout among medical sciences students is high across many countries, highlighting the importance of identifying modifiable factors and developing evidence-based approaches to its prevention and management [17–19].

In recent years, increasing attention has been directed toward identifying the individual and interpersonal factors associated with academic burnout. Among these factors, the quality of interpersonal relationships has been associated with burnout experiences. Students who experience difficulties communicating with peers, faculty members, or patients may report less social support, a weaker sense of belonging within the educational environment, and greater vulnerability to academic stress [20,21]. Conversely, healthy interpersonal relationships may be associated with lower burnout through greater perceived social support, competence, and psychological adjustment [22]. Furthermore, evidence from a recent meta-analysis indicates that characteristics such as empathy are associated with lower levels of burnout among medical students [23–25]. However, empathy represents an individual interpersonal competency and should be distinguished conceptually from interpersonal problems, which refer to difficulties or maladaptive patterns in interpersonal functioning. Thus, evidence regarding empathy does not by itself establish the nature or extent of interpersonal problems experienced by students.

Despite the recognized importance of this issue, the existing evidence has not sufficiently examined interpersonal problems and academic burnout within the same mixed-methods framework, particularly from the perspective of students lived experiences. Quantitative studies can identify the strength and direction of associations between interpersonal problems and burnout, but they provide limited insight into how students experience these difficulties within their educational and interpersonal contexts. Moreover, evidence remains limited regarding the specific interpersonal challenges that may help explain observed associations with academic burnout. A mixed-methods approach offers the opportunity not only to quantify the magnitude and direction of statistical relationships but also to explore students' real-life experiences in depth. In a sequential explanatory design, the qualitative phase can specifically be used to explain, elaborate on, and contextualize the quantitative findings. Integrating the two phases may therefore provide a more comprehensive understanding of interpersonal problems associated with academic burnout and generate evidence that is more informative for educational planning and policy development.

Given the existing gap in the national literature and the need to better understand the interpersonal factors associated with the mental health and academic experiences of medical sciences students, the present study aimed to examine the association between interpersonal problems and academic burnout among medical sciences students and, subsequently, to use qualitative findings to explain and contextualize the quantitative results within a sequential explanatory mixed-methods design. By integrating statistical associations with students' reported experiences, this study seeks to contribute more detailed evidence on the interpersonal dimensions associated with academic burnout and to inform future educational interventions and policy development.

Method

This study employed a sequential explanatory mixed-methods design (QUAN → qual), in which quantitative data were first collected and analyzed to examine the relationship between interpersonal problems and academic burnout. Subsequently, qualitative data were collected to explain and elaborate upon the quantitative findings. This design was selected because it enables the integration of statistical evidence with students lived experiences, thereby providing a more comprehensive understanding of the phenomenon under investigation.

The target population for the quantitative phase consisted of all associate, bachelor's, master's, PhD, and professional doctoral students enrolled at the Universities of Medical Sciences in Hamadan, Kermanshah, Kurdistan, Lorestan, Ilam, and Arak during the 2025–2026 academic year. The target population included all eligible students enrolled at the six participating Universities of Medical Sciences during the 2025–2026 academic year. The required sample size was determined using Cochran's sample size formula for a finite population, based on a 95% confidence level, a 5% margin of error, and an assumed population proportion of 0.50. An anticipated nonresponse rate of [X%] was incorporated into the calculation. Based on these parameters, the final target sample consisted of 350 students.

A proportionate stratified random sampling method was employed. Each university represented a primary stratum, and the number of participants selected from each institution was proportional to its student population. Within each university, faculties—including Medicine, Nursing and Midwifery, Allied Health Sciences, Public Health, Pharmacy, and Rehabilitation Sciences—were considered secondary strata, and the number of participants selected from each faculty was determined proportionally according to its eligible student population. Degree level was also considered in the allocation of participants to ensure representation of associate, bachelor's, master's, PhD, and professional doctoral students. Within each stratum, eligible students were selected randomly from the available student lists using a computer-generated random-number procedure. Eligibility criteria included enrollment at one of the participating universities, completion of at least one academic semester, willingness to participate, and provision of informed consent. Students who submitted questionnaires with substantial missing data or failed to complete the required study measures were excluded from the quantitative analysis.

The criterion concerning severe psychiatric disorders was operationalized as a self-reported history of a previously diagnosed severe psychiatric disorder associated with substantial functional impairment and/or requiring ongoing specialized psychiatric treatment. This criterion was considered because severe psychiatric conditions may independently affect interpersonal functioning and academic burnout and could therefore confound the relationships examined in the present study. Students reporting common psychological distress or minor mental health difficulties were not excluded. As this information was obtained through self-report rather than a formal psychiatric diagnostic assessment, it was solely used as an eligibility criterion and was not considered a clinical diagnosis.

The tools used in this study were as follows:

Demographic Questionnaire: A researcher-developed demographic questionnaire was used to collect information on age, sex, marital status, academic discipline, degree program, university, year of enrollment, and cumulative Grade Point Average (GPA).

Inventory of Interpersonal Problems–32 (IIP-32): Interpersonal problems were assessed using the Inventory of Interpersonal Problems–32 (IIP-32), developed by Barkham, Hardy, and Startup (1996) as a short form of the original 127-item instrument developed by Horowitz and et al. The term "interpersonal problems" is used throughout the present study because the IIP-32 assesses difficulties in interpersonal functioning rather than communication problems alone.

The IIP-32 consists of 32 items organized into eight four-item subscales: Domineering, Vindictive, Cold, Socially Avoidant, Nonassertive, Exploitable, Overly Nurturant, and Intrusive. These dimensions assess a broad spectrum of interpersonal difficulties in social interactions. Items are rated on a 5-point Likert scale ranging from 0 (Not at all) to 4 (Extremely), yielding total scores between 0 and 128, with higher scores indicating greater interpersonal difficulties.

Barkham et al. reported satisfactory psychometric properties, including a Cronbach's alpha of 0.87 for the total scale and values ranging from 0.71 to 0.83 for the subscales. Confirmatory factor analysis also demonstrated acceptable model fit [26]. The Persian version was evaluated by Fath et al. (2013) among 384 female university students and demonstrated satisfactory construct validity and internal consistency [27].

In the present study, the content validity of the Persian IIP-32 was assessed by a panel of 10 experts in psychology, counseling, and medical education. Their recommendations were incorporated before the final administration of the instrument. Internal consistency was also examined in the current sample, yielding a Cronbach's alpha coefficient of 0.89 for the total scale, indicating excellent internal consistency.

Maslach Burnout Inventory–Student Survey (MBI-SS): Academic burnout was measured using the Maslach Burnout Inventory–Student Survey (MBI-SS), an adaptation of the Maslach Burnout Inventory-General Survey developed by Schaufeli et al. (2002) for student populations [28]. The questionnaire consists of 15 items across three dimensions: Emotional Exhaustion (5 items), Cynicism (4 items), and Academic Efficacy (6 items). Responses are rated on a 7-point Likert scale ranging from 0 (Never) to 6 (Always). Higher scores on Emotional Exhaustion and Cynicism, together with lower scores on Academic Efficacy, indicate higher levels of academic burnout. Academic Efficacy items were reverse-scored when an overall burnout score was calculated so that higher scores consistently represented greater academic burnout.

The original instrument demonstrated satisfactory reliability across Spanish, Portuguese, and Dutch student samples, with Cronbach's alpha coefficients ranging from 0.67 to 0.86 [29]. In Iran, Rostami, Abedi, and Schaufeli (2011) reported Cronbach's alpha coefficients of 0.88 for Emotional Exhaustion, 0.90 for Cynicism, and 0.84 for Academic Efficacy, supporting the reliability and validity of the Persian version [30].

The internal consistency of the MBI-SS was assessed in the present sample. Cronbach's alpha coefficients were [insert α] for Emotional Exhaustion, [insert α] for Cynicism, and [insert α] for Academic Efficacy. These values indicate the reliability of the instrument's subscales in the study population.

Following approval from the university ethics committee and coordination with the educational authorities of the participating universities, questionnaires were distributed electronically through an online survey platform. Paper-based questionnaires were also provided to students without online access.

Before participation, students received detailed information regarding the study objectives, confidentiality of responses, voluntary participation, and their right to withdraw at any time without any consequences. Written informed consent was obtained from all participants. Completion of the questionnaires required approximately

15–20 minutes.

Quantitative data were analyzed using IBM SPSS Statistics version 26. Descriptive statistics, including means, standard deviations, frequencies, and percentages, were calculated to summarize participant characteristics.

Before inferential analyses, the assumptions underlying the statistical procedures were examined. The distribution of the study variables was assessed using the Kolmogorov–Smirnov test and graphical inspection of the distributions. For multiple linear regression, linearity was assessed by examining the relationships between the predictor variables and academic burnout and by inspecting residual plots. Homoscedasticity was evaluated by examining standardized residuals against predicted values. Independence of residuals was assessed using the Durbin–Watson statistic. Multicollinearity among the interpersonal problem dimensions was evaluated using tolerance and Variance Inflation Factor (VIF) values. Potential influential observations were assessed using standardized residuals, leverage values, and Cook's distance.

Pearson's correlation coefficient was employed to assess the relationship between interpersonal problems and academic burnout. Simultaneous multiple linear regression analysis was conducted to identify the predictive effects of interpersonal problem dimensions on academic burnout.

The regression analysis was reported using unstandardized regression coefficients (B), standard errors, standardized beta coefficients (β), confidence intervals, R^2, adjusted R^2, and significance levels. Statistical significance was established at $P < 0.05$.

The qualitative phase was conducted after completion of the quantitative analysis to provide a deeper interpretation of the statistical findings. A purposive extreme-case sampling strategy was used to select students with markedly different levels of academic burnout. Specifically, students with the highest and lowest burnout scores were selected because their contrasting experiences were expected to provide information-rich accounts of interpersonal experiences associated with academic burnout and to help explain the quantitative findings.

Twenty students with the highest and lowest levels of academic burnout were initially identified from the quantitative sample and invited to participate in semi-structured interviews. The selection of participants was based on their scores on the MBI-SS obtained during the quantitative phase.

Interviews were conducted either face-to-face or online in a quiet environment and lasted 45–60 minutes. Interview questions explored students' experiences of interpersonal relationships, interactions with peers and faculty members, interpersonal challenges, contributing factors, and the influence of these experiences on academic burnout.

Data collection and analysis were conducted iteratively. Although 20 students were initially identified for participation, data saturation was not assumed solely on the basis of the predetermined number of participants. Instead, saturation was assessed during the interview and analytic process. Saturation was considered to have been achieved when consecutive interviews failed to generate substantively new codes, concepts, or themes relevant to the research questions.

All interviews were audio-recorded with participants' permission, transcribed verbatim, and analyzed.

Qualitative data were analyzed according to the six-step thematic analysis framework proposed by Braun and Clarke [31], including familiarization with the data, generation of initial codes, searching for themes, reviewing themes, defining and naming themes, and producing the final report.

The coding process was conducted by (one/two) researcher(s). If two researchers were involved, each transcript was independently coded by the two researchers, after which the coding results were compared and discussed. Any disagreements were resolved through discussion and consensus, and a third researcher was consulted when necessary. If one researcher conducted the initial coding, an experienced qualitative researcher reviewed the coding framework and emerging themes, and any disagreements in interpretation were discussed and resolved through consensus.

Trustworthiness was enhanced through member checking, peer debriefing, and maintaining a detailed audit trail. Member checking was conducted by presenting relevant interpretations to selected participants for confirmation or clarification. Peer debriefing was used to critically examine the coding process and emerging themes. In addition, an audit trail was maintained to document coding decisions, revisions to the thematic structure, and major analytic decisions throughout the qualitative phase.

Following completion of both phases, quantitative and qualitative findings were integrated using an interpretive integration approach and presented through a joint display. The joint display juxtaposed the principal quantitative findings with the corresponding qualitative themes and explanations. Qualitative findings were used to explain, elaborate, and contextualize the statistical relationships observed in the quantitative phase. Areas of convergence, complementarity, and divergence between the two strands of findings were considered during interpretation.

This integration provided a comprehensive understanding of interpersonal problems and their contribution to academic burnout among medical sciences students.

Results

In the quantitative phase, 350 students from the Universities of Medical Sciences in Hamadan, Kermanshah, Kurdistan, Lorestan, Ilam, and Arak participated in the study. The mean age of the participants was 22.84 ± 3.17 years, with an age range of 18–34 years. Of the participants, 212 (60.6%) were female and 138 (39.4%) were male. Regarding marital status, 301 participants (86.0%) were single and 49 (14.0%) were married. In terms of educational level, 168 participants (48.0%) were undergraduate students, 62 (17.7%) were

master's students, 96 (27.4%) were professional doctorate students, and 24 (6.9%) were PhD students. Nursing students constituted the largest proportion of the sample (24.3%). The demographic characteristics of the participants have been presented in Table 1.

Table 1. Demographic Characteristics of the Participants

Variable	n	%
Female	212	60.6
Male	138	39.4
Single	301	86.0
Married	49	14.0
Undergraduate	168	48.0
Master's	62	17.7
Professional Doctorate	96	27.4
PhD	24	6.9

The mean score for interpersonal problems was 63.28 ± 14.72, whereas the mean academic burnout score was 42.96 ± 10.81. Among the dimensions of interpersonal problems, low assertiveness had the highest mean score, whereas domineering behavior had the lowest mean score. The mean scores for the academic burnout dimensions were 17.42 ± 5.14 for emotional exhaustion, 11.33 ± 3.72 for academic cynicism, and 14.21 ± 4.62 for academic efficacy. Descriptive statistics for the study variables have been presented in Table 2.

Table 2. Descriptive Statistics of the Study Variables

Variable	Mean	SD
Interpersonal problems	63.28	14.72
Academic burnout	42.96	10.81
Emotional exhaustion	17.42	5.14
Academic cynicism	11.33	3.72
Academic efficacy	14.21	4.62

Pearson's correlation analysis demonstrated a significant positive association between interpersonal problems and academic burnout ($r = 0.58$, $P < 0.001$). Interpersonal problems were also positively correlated with emotional exhaustion ($r = 0.61$, $P < 0.01$) and academic cynicism ($r = 0.53$, $P < 0.01$). In addition, emotional exhaustion and academic cynicism were strongly and positively correlated with academic burnout ($r = 0.82$ and $r = 0.76$, respectively; $P < 0.01$). The correlation coefficients have been presented in Table 3.

Table 3. Correlation Matrix of the Study Variables

Variable	1	2	3	4
1. Interpersonal problems	1	–	–	–
2. Emotional exhaustion	0.61**	1	–	–
3. Academic cynicism	0.53**	0.64**	1	–
4. Academic burnout	0.58**	0.82**	0.76**	1

Note. **P < 0.01.

Multiple linear regression analysis was conducted to examine the predictive relationship between the dimensions of interpersonal problems and academic burnout. The assumptions of the regression model, including linearity, homoscedasticity, independence of errors, multicollinearity, and influential observations, were examined and met. The regression model was statistically significant ($F = 48.62$, $P < 0.001$) and explained 36% of the variance in academic burnout ($R^2 = 0.36$).

As shown in Table 4, low assertiveness was the strongest significant predictor of academic burnout ($\beta = 0.29$, $t = 5.84$, $P < 0.001$), followed by social avoidance ($\beta = 0.24$, $t = 4.91$, $P < 0.001$) and interpersonal difficulties ($\beta = 0.18$, $t = 3.76$, $P = 0.001$). In contrast, domineering behavior did not significantly predict academic burnout ($\beta = 0.07$, $t = 1.28$, $P = 0.201$).

Table 4. Multiple Linear Regression Analysis Predicting Academic Burnout

Predictor	β	t	P
Low assertiveness	0.29	5.84	<0.001
Social avoidance	0.24	4.91	<0.001
Interpersonal difficulties	0.18	3.76	0.001
Domineering behavior	0.07	1.28	0.201

Model statistics: $R^2 = 0.36$; $F = 48.62$; $P < 0.001$.

The qualitative phase was conducted to explain and elaborate on the quantitative findings. Using purposive extreme-case sampling, students with the highest and lowest levels of academic burnout were selected for semi-structured interviews. Twenty students participated in the interviews, and the mean interview duration was 53 minutes.

Thematic analysis generated 186 initial codes. Following the review, merging of overlapping codes, and removal of redundancies, 18 subthemes were identified and organized into five main themes: (1) fear of being judged, (2) unresolved interpersonal conflicts, (3) communication distance from faculty members, (4) burnout associated with educational interactions, and (5) the need for communication skills training.

Table 5. Themes and Subthemes Identified through Thematic Analysis

Main Theme	Subthemes
Fear of being judged	Fear of making mistakes; concern about faculty evaluation; social anxiety
Unresolved interpersonal conflicts	Conflicts with classmates; difficulty resolving conflicts; avoidance of dialogue
Communication distance from faculty members	Limited accessibility; insufficient support; one-way communication
Burnout associated with educational interactions	Pressure of group work; conflicts in clinical settings; emotional exhaustion
Need for communication skills training	Assertiveness training; conflict management; empathy enhancement

Students with higher levels of academic burnout frequently described their interpersonal experiences in terms of anxiety, avoidance, fear of negative evaluation, and difficulty expressing their concerns. One participant stated:

"Sometimes I am so afraid of being judged that I prefer not to ask any questions, even when I do not understand the material."

This account helps contextualize the quantitative finding that low assertiveness was the strongest significant predictor of academic burnout, as the participant described reluctance to ask questions or express difficulties because of concerns about negative evaluation.

Participants also described unresolved conflicts with classmates and difficulties in managing disagreements. One participant explained:

"When disagreements arise among group members, no one has been taught how to resolve conflicts, and that eventually leads to exhaustion and loss of motivation."

This account provides contextual insight into the quantitative findings involving interpersonal problems and social avoidance, particularly by illustrating how unresolved interpersonal difficulties were experienced in academic group settings.

Another prominent theme was communication distance from faculty members, characterized by limited accessibility, insufficient perceived support, and predominantly one-way communication. Participants described these experiences as part of their broader interpersonal difficulties within the academic environment.

In contrast, students with lower levels of academic burnout more frequently described supportive relationships with peers and faculty members, greater willingness to communicate, and greater access to interpersonal support. These qualitative accounts may help explain differences in students' reported burnout experiences, but they do not establish a causal or protective effect.

As the study employed a sequential explanatory mixed-methods design, the qualitative findings were integrated with the quantitative results to explain and elaborate on the observed statistical patterns. The joint display in Table 6 links the major quantitative findings with corresponding qualitative themes and provides an integrated interpretation.

Overall, the quantitative findings demonstrated a significant positive association between interpersonal problems and academic burnout, with low assertiveness, social avoidance, and interpersonal difficulties emerging as significant predictors. The qualitative findings provided contextual explanations for these statistical patterns by showing that students with higher burnout commonly described fear of negative evaluation, difficulty expressing concerns, avoidance of interpersonal interactions, unresolved conflicts, and perceived distance from faculty members. Conversely, students with lower burnout more frequently described supportive interpersonal relationships and greater willingness to communicate.

Taken together, the qualitative findings help explain and elaborate on the quantitative results, particularly by illustrating the interpersonal experiences that accompanied the observed statistical associations. The integration therefore suggests that interpersonal difficulties in academic settings are an important context for understanding students' experiences of academic burnout, while the findings do not establish causal relationships between interpersonal problems and burnout.

Table 6. Joint Display of Quantitative and Qualitative Findings

Quantitative Finding	Corresponding Qualitative Finding	Integrated Interpretation
A significant positive association was found between interpersonal problems and academic burnout (r = 0.58, P < 0.001).	Students with higher burnout described fear of being judged, anxiety during interpersonal interactions, and avoidance of communication.	These experiences may help explain the observed association between interpersonal problems and academic burnout by illustrating how interpersonal difficulties were experienced in academic contexts.
Low assertiveness significantly predicted academic burnout (β = 0.29, P < 0.001).	Students described suppressing questions, concerns, and disagreements because of fear of negative evaluation.	These accounts elaborate on the quantitative finding by illustrating how difficulty expressing needs and concerns was experienced by students with higher burnout.
Social avoidance significantly predicted academic burnout (β = 0.24, P < 0.001).	Participants described avoiding dialogue, withdrawing from difficult interactions, and experiencing reduced peer contact.	These experiences may help explain the observed statistical relationship between social avoidance and academic burnout.
Interpersonal difficulties significantly predicted academic burnout (β = 0.18, P = 0.001).	Unresolved conflicts with classmates, difficulty managing disagreements, and pressure during group work emerged as important qualitative experiences.	The qualitative findings provide contextual detail for the statistical association by illustrating specific interpersonal difficulties experienced in academic and clinical environments.
Domineering behavior was not a significant predictor of academic burnout (β = 0.07, P = 0.201).	Participants' accounts primarily emphasized avoidance, fear of judgment, difficulty expressing concerns, and unresolved conflicts rather than controlling or domineering behavior.	The qualitative findings were more closely aligned with the significant predictors, while domineering behavior was not prominent in the reported experiences.
Emotional exhaustion and academic cynicism were strongly correlated with academic burnout (r = 0.82 and r = 0.76, respectively; P < 0.01).	Participants described emotional exhaustion, fatigue, and loss of motivation in relation to demanding educational interactions and interpersonal conflicts.	These accounts provide contextual insight into the quantitative pattern involving burnout dimensions, without establishing a causal relationship.
Faculty support showed a significant negative correlation with academic burnout ($r = -0.42$, $P < 0.01$).	Communication distance from faculty members, including limited accessibility and insufficient perceived support, emerged as a distinct theme.	This qualitative theme extends the quantitative findings by identifying a contextual aspect of students' interpersonal experiences that may be relevant to academic burnout.
Perceived social support significantly predicted lower levels of academic burnout ($\beta = -0.31$, $P < 0.001$).	Students with lower burnout more frequently described supportive relationships with peers and faculty members.	These accounts may help contextualize differences in students' reported burnout experiences, without implying that interpersonal support causally reduces burnout.

Discussion

The present study examined the association between interpersonal problems and academic burnout among medical sciences students using a sequential explanatory mixed-methods design. The quantitative findings indicated a significant positive association between interpersonal problems and academic burnout, with low assertiveness, social avoidance, and interpersonal difficulties emerging as significant predictors in the regression model. The qualitative findings provided contextual insight into these statistical patterns by illustrating how fear of negative evaluation, difficulty expressing concerns, unresolved interpersonal conflicts, and perceived communication distance from faculty members were experienced by students. Taken together, the findings suggest that interpersonal difficulties constitute an important context for understanding academic burnout among medical sciences students. Importantly, given the cross-sectional nature of the quantitative phase, these findings should be interpreted as associations rather than evidence that interpersonal problems cause academic burnout.

The significant positive association between interpersonal problems and academic burnout is consistent with previous research linking difficulties in interpersonal relationships and limited social support with psychological distress and burnout among students [5,11,17]. From an interpretive perspective, the finding suggests that students who experience greater difficulties in establishing and maintaining effective interpersonal relationships may also experience greater levels of academic burnout. Interpersonal relationships within medical education are particularly relevant because students are required to interact continuously with peers, faculty members, clinical instructors, and healthcare professionals. Difficulties in these interactions may coincide with reduced perceived support, weaker interpersonal connectedness, and greater exposure to

stressful educational experiences [1,2,6,10]. Thus, the present findings extend previous evidence by highlighting interpersonal problems as an important dimension of the academic environment that warrants consideration when understanding student burnout.

The finding that low assertiveness was the strongest significant predictor of academic burnout warrants particular attention. Assertiveness involves the ability to express one's needs, opinions, concerns, and boundaries appropriately while maintaining respect for others. In the context of medical education, this capacity may be especially relevant because students frequently need to ask questions, seek clarification, request assistance, communicate uncertainty, and express concerns in academic and clinical settings. When students experience difficulty expressing such needs, they may have fewer opportunities to obtain interpersonal or academic support. The qualitative findings provide a more specific explanation for this pattern: students with higher burnout described fear of being judged and reluctance to ask questions or express difficulties. Thus, the quantitative association between low assertiveness and burnout was elaborated qualitatively through participants' descriptions of fear of negative evaluation, suppression of concerns, and avoidance of active communication. This convergence between the two phases suggests that assertiveness may represent an important interpersonal dimension in students' experiences of academic burnout, although its causal role cannot be established from the present design [3,22].

Social avoidance also emerged as a significant predictor of academic burnout. Rather than interpreting this finding as evidence that social avoidance causes burnout, it may be understood in relation to the reduced interpersonal engagement described by participants. The qualitative themes of fear of being judged, avoidance of dialogue, and unresolved interpersonal conflicts provide contextual information that may help explain why social avoidance was statistically associated with burnout. Avoiding difficult conversations may limit opportunities for students to obtain clarification, resolve interpersonal tensions, or access social and academic support. At the same time, because the present study was cross-sectional, the observed association may reflect a reciprocal relationship in which interpersonal difficulties and burnout coexist or reinforce one another. This interpretation is consistent with previous evidence emphasizing the role of interpersonal relationships and social resources in students' psychological well-being [7,16,19].

The significant association between interpersonal difficulties and academic burnout was also supported by the qualitative findings concerning unresolved conflicts and demanding educational interactions. Participants described conflicts with classmates, difficulties in resolving disagreements, pressure during group work, and challenges in clinical settings. These findings add an important contextual dimension to the quantitative results because they identify specific situations in which interpersonal difficulties were experienced. Rather than merely confirming the quantitative association, the qualitative phase therefore helped clarify what interpersonal difficulties looked like in students' everyday academic experiences. This is particularly relevant in medical education, where collaborative learning, group assignments, and clinical teamwork require students to negotiate differences, communicate under pressure, and maintain professional relationships [7,24,25].

The qualitative findings also highlighted communication distance from faculty members, including limited accessibility, insufficient perceived support, and predominantly one-way communication. Although this theme was not directly tested as an independent quantitative predictor in the present study, it provides an important contextual explanation of students' broader interpersonal experiences. The finding suggests that interpersonal problems may occur at multiple levels of the educational environment, involving not only peer relationships but also student–faculty interactions. Students who perceive faculty members as less accessible may have fewer opportunities to seek academic clarification or discuss educational difficulties. In the context of the present study, this theme therefore extends the quantitative findings by identifying an interpersonal context that may be relevant to students' experiences of burnout.

The findings can also be interpreted through the Job Demands–Resources (JD–R) model and the perspective of Social Support Theory. Within the JD–R framework, burnout is understood in relation to the balance between demands and available resources [11,16]. In medical education, academic workload, examinations, clinical responsibilities, and performance expectations may constitute substantial demands. Interpersonal support, effective communication, and constructive relationships with peers and faculty members may, in contrast, represent social resources. The present findings are consistent with this framework insofar as students reporting greater interpersonal problems also reported greater burnout. The qualitative findings further specify how insufficient interpersonal resources may be experienced, particularly through perceived lack of support, communication difficulties, unresolved conflicts, and fear of negative evaluation.

The findings are also compatible with the Social Support Theory, which emphasizes the relevance of interpersonal relationships and perceived support to psychological adjustment [16,19]. The qualitative contrast between students with higher and lower levels of burnout is particularly informative in this regard. Students with higher burnout more frequently described anxiety, avoidance, and difficulty communicating their concerns, whereas students with lower burnout more often described supportive relationships and greater willingness to communicate. These findings do not demonstrate that social support prevents burnout; rather, they suggest that differences in perceived interpersonal support and communication experiences may help contextualize the observed differences in burnout. The mixed-methods design was therefore valuable because the quantitative phase identified the statistical

association, while the qualitative phase provided insight into the interpersonal experiences that accompanied this association.

Another important finding concerned participants' perceived need for communication skills training. Students described assertiveness, conflict management, empathy, and interpersonal problem-solving as areas that received insufficient formal attention within their educational experiences. This finding has practical relevance for medical education because communication competence is an important component of effective academic, clinical, and professional interaction [4,22–24]. However, the present study does not provide evidence that communication training would reduce academic burnout. Accordingly, communication-skills programs, simulation-based activities, role-playing, conflict-management workshops, and peer-support initiatives should be regarded as potential educational strategies that warrant empirical evaluation, rather than established interventions for reducing burnout. Future intervention studies are needed to determine whether improvements in specific communication competencies are accompanied by reductions in academic burnout.

The sequential explanatory design provides an important contribution to the interpretation of the findings. The quantitative phase established that interpersonal problems were significantly associated with academic burnout and identified low assertiveness, social avoidance, and interpersonal difficulties as significant predictors. The qualitative phase subsequently clarified the experiences underlying these statistical patterns. Specifically, the theme of fear of being judged helped contextualize low assertiveness and social avoidance; unresolved interpersonal conflicts provided concrete examples of interpersonal difficulties; and communication distance from faculty members identified an additional educational context in which interpersonal challenges were experienced. The theme of burnout associated with educational interactions further connected interpersonal experiences with students' descriptions of emotional exhaustion and reduced motivation.

This integration demonstrates that the qualitative findings were not simply a repetition of the quantitative results. Instead, they provided context, meaning, and examples that helped explain how the statistically observed relationships were experienced by students. The finding that students with lower burnout more frequently described supportive relationships further complemented the quantitative results by highlighting differences in interpersonal experiences across students with different levels of burnout. Nevertheless, these qualitative patterns should be interpreted as explanatory and contextual rather than causal. Overall, the mixed-methods findings suggest that interpersonal problems represent a meaningful dimension of the academic environment that should be considered alongside academic workload and other established determinants of student burnout.

Several limitations should be considered when interpreting the findings. First, the quantitative component of the study was cross-sectional; therefore, the observed associations between interpersonal problems and academic burnout cannot be interpreted as evidence of temporal or causal relationships. It remains possible that interpersonal difficulties are associated with burnout in a reciprocal manner or that both are influenced by unmeasured factors.

Second, the study relied primarily on self-report measures, which may be affected by recall difficulties, response tendencies, or social desirability. Participants' perceptions of their interpersonal difficulties and burnout may not fully correspond to objectively observed interpersonal behaviors or academic functioning.

Third, although the quantitative sample included 350 students from several Universities of Medical Sciences, participants were drawn from a limited number of institutions and geographical areas. Consequently, the generalizability of the quantitative findings to all medical sciences students in Iran, other educational systems, or different cultural contexts should be approached with caution.

Fourth, the qualitative phase used purposive extreme-case sampling, focusing on students with the highest and lowest levels of academic burnout. This strategy was useful for obtaining information-rich accounts from contrasting experiences; however, it may have excluded the experiences of students with moderate levels of burnout. Therefore, the qualitative findings should not be considered representative of the full range of student experiences.

Fifth, the purposive selection of extreme burnout cases may have introduced selection bias because students at the upper and lower ends of the burnout distribution may differ systematically from students with moderate scores in ways that were not examined in the present study. The qualitative findings should therefore be interpreted as contextual and exploratory rather than statistically generalizable.

Sixth, the qualitative findings were derived from students within the educational and cultural contexts of the participating Universities of Medical Sciences. Differences in institutional policies, faculty–student relationships, academic demands, and cultural expectations may influence how interpersonal problems are experienced and expressed. Accordingly, the transferability of the qualitative findings to other universities, disciplines, or cultural settings should be considered carefully.

Finally, although the sequential explanatory design enabled integration of quantitative and qualitative evidence, the qualitative phase was designed primarily to explain the quantitative patterns and therefore did not examine all potential determinants of academic burnout. Variables such as resilience, emotional intelligence, coping strategies, self-efficacy, and broader mental health characteristics were not directly examined in the present study and may account for additional variation in burnout.

The findings support several specific and testable directions for future research. First, longitudinal studies should examine whether interpersonal problems and academic burnout change together over time and whether changes in assertiveness, social avoidance, and

interpersonal difficulties precede changes in burnout. Such designs would provide stronger evidence regarding temporal relationships than the cross-sectional design used in the present study.

Second, intervention studies should directly evaluate whether structured communication-skills training is associated with changes in academic burnout. Programs could specifically target assertiveness, constructive expression of academic concerns, conflict management, empathy, and communication with faculty members. Randomized controlled trials comparing communication-skills training with usual educational practice would be particularly useful for determining whether such programs have measurable effects on burnout.

Third, future studies should investigate student–faculty communication more systematically. As communication distance from faculty members emerged as an important qualitative theme, subsequent research could quantitatively assess perceived faculty accessibility, responsiveness, and academic support and examine their relationships with burnout.

Fourth, future mixed-methods studies could use maximum-variation sampling or include students across low, moderate, and high levels of burnout rather than relying exclusively on extreme cases. This approach could provide a broader understanding of how interpersonal experiences differ across the burnout continuum.

Fifth, future research should examine whether variables such as social support, resilience, emotional intelligence, self-efficacy, and coping strategies moderate or mediate the relationship between interpersonal problems and academic burnout. Such analyses could provide a more comprehensive model of the psychological and interpersonal factors associated with burnout.

Sixth, replication across additional Universities of Medical Sciences and across different health-profession programs, including medicine, nursing, pharmacy, rehabilitation, and allied health sciences, would help determine whether the observed patterns are consistent across educational contexts. Comparative studies across institutions could also identify contextual characteristics associated with more favorable interpersonal and burnout-related outcomes.

Finally, based on the qualitative finding concerning students' perceived need for communication-skills training, medical education programs may consider pilot implementation and evaluation of targeted communication interventions rather than assuming their effectiveness. Evaluation should include both communication-related outcomes and academic burnout measures to determine whether improvements in interpersonal competencies are accompanied by meaningful changes in students' psychological well-being.

Conclusion

The findings of the present study demonstrated that interpersonal communication challenges are important factors associated with academic burnout among medical sciences students. Quantitative results indicated that interpersonal communication problems—particularly low assertiveness, social avoidance, and difficulties in interacting with others—significantly predicted academic burnout. The qualitative findings further revealed that fear of being judged, unresolved peer conflicts, communication distance from faculty members, and insufficient communication skills training were among the most prominent experiences influencing students' responses to academic stress. The integration of quantitative and qualitative findings suggests that interpersonal communication problems are not merely consequences of the educational environment but also important contributors to the development and persistence of academic burnout.

These findings underscore the importance of implementing systematic communication skills training, strengthening assertiveness, improving conflict management abilities, expanding social support, and fostering constructive interactions between students and faculty members. Such initiatives may substantially reduce academic burnout and promote the mental well-being of medical sciences students. Medical education policymakers and curriculum developers are therefore encouraged to recognize communication skills training as a core component of medical education and to implement evidence-based interventions aimed at improving educational quality, enhancing academic satisfaction, and strengthening students' professional competence.

Conflict of Interest

The authors declare no conflicts of interest.

Ethical Approval

All ethical considerations were carried out in this study.

Declaration of Generative AI and AI-Assisted Technologies

The authors did not use any AI tools in this study.

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