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Perceived Social Support and Entrepreneurial Self-Efficacy in Medical and Allied Health Students: A Cross-Sectional Study

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Abstract

Background

Entrepreneurial self-efficacy (ESE) is an important psychological construct underlying confidence in performing entrepreneurial tasks. However, evidence regarding factors associated with ESE among medical and allied health students, particularly the role of perceived social support, remains limited. This study examined the association between perceived social support and ESE among medical and allied health students.

Methods

This analytical cross-sectional study included 488 medical and allied health students at a medical university in Iran. Data were collected using a Persian-translated version of the Entrepreneurial Self-Efficacy Scale and the validated Persian version of the Multidimensional Scale of Perceived Social Support. Participants were recruited using proportional quota sampling followed by convenience sampling within predefined quotas. Pearson correlation analysis was used to examine bivariate associations. Multivariable linear regression was performed with multiple imputation for missing data, and estimates were pooled across 20 imputed datasets after adjustment for prespecified demographic and educational covariates.

Results

Perceived social support was positively correlated with ESE ($r = 0.21$, $p < 0.01$). In the adjusted multivariable model, male sex ($B = 5.68$, 95% CI: 3.67–7.70; $p < 0.001$) and support from friends ($B = 0.082$, 95% CI: 0.017–0.147; $p = 0.014$) were independently associated with higher ESE. Family support and support from significant others were not significantly associated with ESE after adjustment. Among the ESE dimensions, planning had the highest mean score, whereas implementation with financial resources had the lowest.

Conclusions

Perceived social support was positively associated with ESE, and support from friends remained independently associated with higher ESE after adjustment for relevant covariates. These findings suggest that peer-related social support may be relevant to ESE among medical and allied health students, although the cross-sectional design precludes conclusions about temporality or causality. Longitudinal and intervention studies are needed to clarify the direction and mechanisms of these associations.

Introduction

Rapid technological advancement, demographic change, rising healthcare costs, and growing demand for accessible, high-quality, and sustainable services are reshaping healthcare systems worldwide. Consequently, healthcare professionals are increasingly expected to develop competencies beyond clinical expertise, including innovation, leadership, opportunity recognition, and entrepreneurship. Entrepreneurship has therefore become an increasingly relevant component of health professions education, with the potential to prepare future healthcare professionals to develop innovative solutions and respond to evolving healthcare needs(1, 2).

Entrepreneurial self-efficacy (ESE), defined as confidence in one's ability to perform entrepreneurial roles and tasks successfully, is an important cognitive factor underlying entrepreneurial behavior. Higher ESE has been associated with entrepreneurial intention, opportunity recognition, persistence, and engagement in entrepreneurial activities, and evidence suggests that ESE can be developed through learning and experience(3, 4). From the perspective of Social Cognitive Theory, self-efficacy is influenced by mastery experiences, observational learning, social persuasion, and interpretations of emotional and physiological states(5, 6). Social environments may provide opportunities for these sources of efficacy information through encouragement, information exchange, role modeling, feedback, and participation. Complementarily, Social Capital Theory emphasizes the informational, relational, and instrumental resources embedded in social networks that may facilitate learning, innovation, and entrepreneurial development(5, 6). Together, these perspectives provide a theoretical basis for examining perceived social support as a contextual factor associated with ESE.

Empirical evidence from different educational settings supports the relevance of social and educational environments to entrepreneurial development, although findings vary across populations and contexts. Studies among engineering and general higher-education students have reported associations between university entrepreneurial support, family support, entrepreneurship education, ESE, and entrepreneurial intention(7–9). For example, research in India found that extracurricular university support for entrepreneurship was positively associated with ESE, whereas studies in Pakistan, Vietnam, and Malaysia highlighted relationships among ESE, family support, entrepreneurship education, and entrepreneurial intention(7–9). These findings suggest that social and educational environments may be relevant to ESE, but their associations may differ across cultural and educational contexts.

Evidence among health professions students remains comparatively limited. A cross-sectional study of 1,518 health sciences students in Spain found that perceived desirability and feasibility were associated with entrepreneurial intention, whereas self-efficacy did not show a direct association with entrepreneurial intention(3). These findings indicate that entrepreneurial development in healthcare students may involve factors beyond ESE and that evidence from business, engineering, or general university populations may not be directly transferable to health professions education. Importantly, existing research has rarely examined the independent contributions of different sources of perceived social support to ESE among healthcare students.

Several gaps therefore remain. First, research on ESE has predominantly focused on business, management, engineering, or general university populations, with comparatively limited evidence from health professions education. Second, previous studies have frequently focused on entrepreneurial intention rather than ESE, which represents an important cognitive construct underlying entrepreneurial behavior and may be particularly responsive to educational and social experiences. Third, perceived social support has often been examined as a general construct or through a single source, such as family support. Few studies have simultaneously examined support from family, friends, and significant others and assessed their independent associations with ESE after adjustment for potential confounding factors. This gap may be particularly relevant in Iran and other Middle Eastern settings, where social and family networks may play an important role in students' educational and career development.

The present study therefore examined the association between perceived social support and ESE among medical and allied health students at a university of medical sciences in Iran. We separately assessed support from family, friends, and significant others and examined their independent associations with ESE after adjustment for demographic characteristics. Guided by Social Cognitive Theory and Social Capital Theory, we hypothesized that higher perceived social support would be associated with higher ESE.

2. Methods

2.1. Study design and settings

This analytical cross-sectional study was conducted from January to June 2025 at Jahrom University of Medical Sciences, Iran, to examine the association between perceived social support and entrepreneurial self-efficacy(ESE) among students in health-related fields of study. Perceived social support was considered the primary independent variable, ESE the dependent variable, and demographic characteristics were included as potential covariates. As the exposure and outcome were assessed concurrently, the findings represent associations and should not be interpreted as causal relationships.

2.2. Participants and Sampling

The study population comprised all undergraduate, postgraduate, and general medical students enrolled at Jahrom University of Medical Sciences during the study period. Eligible participants were students who were enrolled at the university and had completed at least one academic semester. Students who declined to provide written informed consent or returned questionnaires with substantial missing data were excluded from the final analysis.

The required sample size was calculated using the single-population mean formula based on parameters reported by Wang et al. for perceived social support. Assuming a mean score of 3.658, a standard deviation of 0.60, a precision of 0.06, and a two-sided significance level of 0.05, the minimum required sample size was 400 participants(10). To account for potential non-response and incomplete

questionnaires, the sample size was increased by approximately 20%, resulting in a target sample of 480 students.

According to official university enrollment records, 1,116 students were enrolled during the study period and constituted the sampling population. Proportional quota sampling was used to ensure representation of students across academic disciplines and educational levels according to their respective proportions in the university population. In addition, an approximately equal distribution of male and female students was targeted. Within each predefined quota, students were recruited using convenience sampling until the target sample size was reached. Overall, 488 students completed the questionnaires and met the criteria for inclusion in the final analysis.

2.3. Data Collection Procedure

Data were collected using anonymous, self-administered paper questionnaires. Before questionnaire administration, the principal investigator provided standardized verbal instructions regarding the study objectives, voluntary participation, confidentiality of the collected data, and procedures for completing the questionnaires. Written informed consent was obtained from all participants before questionnaire distribution. Students completed the questionnaires individually during scheduled academic time without interacting with their peers. No personal identifying information was collected. Upon completion, questionnaires were returned directly to the researcher and immediately collected to maintain anonymity and confidentiality. These procedures were implemented to minimize information and social desirability bias.

2.4. Study Measures

All study measures were assessed using standard and validated questionnaires. Permission to use the instruments was obtained where required, and the validated Persian versions of both questionnaires were administered (11–13).

2.4.1. Demographic Characteristics

Participants completed a demographic questionnaire to collect data on age, gender, area of study, and level of education. These factors were included to describe the study population and were considered as potential confounders for multivariable analysis.

2.4.2Entrepreneurial Self-Efficacy

Entrepreneurial self-efficacy was measured using the Entrepreneurial Self-Efficacy Scale developed by McGee et al. (2009). The instrument consists of 19 items across five dimensions: searching, planning, marshaling, implementation with personnel, and implementation with financial resources. Items are rated on a 5-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree), yielding a total score of 19–95, with higher scores indicating greater entrepreneurial self-efficacy(13).

Because no validated Persian version of the scale was available, the original English version was translated and culturally adapted for use in the present study. The translation process included independent forward translation into Persian by two bilingual translators, followed by independent back-translation into English by two translators who were blinded to the original version. The research team compared the translated and back-translated versions with the original instrument and resolved discrepancies through consensus. Subsequently, a panel of 10 experts in epidemiology, psychology, sociology, behavioral sciences and health education reviewed the Persian version for linguistic clarity, cultural appropriateness, and content relevance. Based on their feedback, minor wording modifications were made to improve the clarity and comprehensibility of a limited number of items for Iranian university students. The revised questionnaire was then pilot-tested qualitatively with 30 students from the target population to assess comprehension, interpretation, and acceptability. The pilot testing resulted only in minor linguistic refinements; no changes were made to the number of items, five-dimensional structure, response options, scoring procedure, or conceptual meaning of the original items. Thus, the final Persian version retained the original structure and scoring of the McGee et al. scale. In the present study, the scale demonstrated satisfactory internal consistency, with a Cronbach's alpha coefficient of 0.87.

2.4.3. Perceived Social Support

Social support was assessed by the Multidimensional Scale of Perceived Social Support (MSPSS) developed by Zimet et al. The MSPSS is a 12-item measure with three subscales measuring support from family, friends, and significant others. Each item was rated on a seven-point Likert scale from 1 (strongly disagree) to 7 (strongly agree). The total score ranged from 12 to 84 and the subscale scores ranged from 4 to 28. Higher scores mean greater perception of social support. The present study utilized the validated Persian version of the MSPSS. The Persian version of the Multidimensional Scale of Perceived Social Support (MSPSS), which was translated and psychometrically validated for use in an Iranian population by Bagherian-Sararoudi et al., was used in the present study(14). The present sample showed excellent internal consistency for this instrument, with a Cronbach's alpha coefficient of 0.92.

2.5. Quality Assurance

Several methodological techniques were used to improve data quality and reduce potential sources of bias. To ensure the reliability and validity of measurement, standardized and previously validated Persian versions of all study instruments were used. The questionnaires were reviewed by experts panel before data collection to ensure their contextual appropriateness for the target population.

To decrease information and social desirability biases, anonymous questions were posed with no personally identifiable information, all participants received standardized instructions, and no faculty members were present during questionnaire administration. Moreover, both the independent and dependent variables were measured using self-report questionnaires; therefore, the potential for common method bias was statistically assessed using Harman's single-factor test. The results showed that no single component explained the majority of the total variance, suggesting that common method bias was unlikely to significantly impact the study findings.

2.6. Statistical Analysis

Statistical analyses were performed using IBM SPSS Statistics version 25 (IBM Corp., Armonk, NY, United States). Descriptive statistics was used to explain the demographic characteristics of the individuals and the variables of the research. Continuous variables were expressed as mean ± standard deviation (SD) and categorical variables were expressed as frequencies and percentages.

The Kolmogorov–Smirnov test was used to evaluate the distribution of continuous variables and histograms and normal probability (Q–Q) plots were used to visually inspect the data. Pearson's correlation coefficient was used to analyze bivariate relationships between entrepreneurial self-efficacy and dimensions of perceived social support.

The extent and pattern of missing data were assessed before the analyses. Little's MCAR test was used to evaluate whether the missing-data pattern was consistent with the assumption of missing completely at random(15, 16). Missing data were handled using multiple imputation (MI) with the Fully Conditional Specification (FCS) approach. Twenty imputed datasets were generated, with predictive mean matching (PMM) used for continuous variables. Estimates from the imputed datasets were pooled according to Rubin's rules and used as the primary estimates in the multivariable analyses(17). A complete-case analysis was additionally performed as a sensitivity analysis.

A multivariable linear regression analysis was performed using the Enter (forced-entry) method to examine the independent association between perceived social support and entrepreneurial self-efficacy after adjusting for potential confounders including age, sex, marital status, educational attainment, field of study, residence and familial history of self-employment. Before estimating the model, tests were conducted for model assumptions such as linearity, homoscedasticity, normality of residuals, independence of errors and multicollinearity. Multicollinearity was checked using variance inflation factor (VIF) and tolerance statistics; VIF values less than 5 and tolerance values greater than 0.20 were considered acceptable(18, 19).

As a sensitivity analysis, a complete-case analysis was conducted to assess the robustness of the results. We compared regression coefficients, confidence intervals, and statistical significance of the complete case estimates with pooled estimates from the multiply imputed data sets. Statistical significance was considered at two-sided P value < 0.05.

2.7. Ethical Considerations

The study protocol was approved by the Research Ethics Committee of Jahrom University of Medical Sciences (Approval No. IR.JUMS.REC.1402.079). All participants were fully informed of the aims and procedures of the study and provided written informed consent prior to enrollment. Students were told they could decline to participate or withdraw from the study at any time without academic repercussions, and participation was voluntary. All questionnaires were anonymous and the confidentiality of the participants' information was strictly maintained during data collection, analysis and reporting. The study was performed in accordance with the ethical standards of the Declaration of Helsinki.

3.Results

3.1. Participant Characteristics

The study comprised a total of 488 students. The sample consisted of an approximately equal distribution of female and male students, with a mean age of 22.2 ± 2.9 years. Undergraduate and general physician students constituted the predominant group of participants, with medicine being the most prevalent field of study. Comprehensive participant characteristics are specified in Table 1.

Table 1
Demographic Characteristics of Participants in the Study on Entrepreneurial Self-Efficacy Among Medical University Students

Variables		**n(%)**	**Missing Data**
		488	**n(%)**
sex	Female	251(51.6)	2(0.4)
	Male	235 (48.4)	
Grade	General physician	208 (43.0)	0(0)
	Bachler	263 (53.9)	
	Master	17 (3.5)	
Field	General physician	208 (43.0)	3(0.6)
	Health expert	50 (10.2)	
	Operating room expert	51 (10.5)	
	Nurse	76 (15.6)	
	Anesthesia	30(6.1)	
	Laboratory Science	53 (10.9)	
	Master of Community Health Nursing	10(2.0)	
	Master of Parasitology	7 (1.4)	
Age	22.2 ± 2.9		3(0.6)

3.2. Missing Data

Missingness was low for demographic variables (< 5%) but was higher for entrepreneurial self-efficacy (11.3%) and perceived social support (8.8%) (Tables 1 and 2). Little's MCAR test was not statistically significant ($\chi^2 = 140.791$, df = 143, P = 0.537), indicating that the observed missing-data pattern was consistent with the MCAR assumption. Multiple imputation was therefore used for the primary analyses.

Results from the complete-case sensitivity analysis were comparable to those obtained from the imputed datasets.

3.3. Descriptive Statistics

The mean score of entrepreneurial self-efficacy was 69.4 ± 10.5 and the mean score of perceived social support was 72.8 ± 15.9. The highest mean score among entrepreneurial self-efficacy domains was for planning (70.7 ± 14.1) and the lowest was for implementing with financial resources (65.7 ± 16.1). Family support had the highest mean score (76.1 ± 17.5) in terms of perceived social support, while support from friends recorded the lowest mean score (66.6 ± 20.2). Table 2 presents the descriptive statistics in detail.

Table 2
Mean and Standard Deviation of Entrepreneurial Self-Efficacy and Social Support Scores and Their Dimensions Among Medical Students

variables	**Mean (SD)**	**Missing Data n(%)**
Total score of Entrepreneurial self-efficacy	69.4(10.5)	55(11.3)
Searching	70.2(14.4)	6(1.2)
Planning	70.7(14.1)	10(2)
Marshaling	69.2 (14.7)	22(4.5)
Implementing with people	69.1(14.1)	23(4.7
Implementing with financial resources	65.7(16.1)	3(0.6)
Social support	72.8(15.9)	43(8.8)
Family support	76.1(17.5)	26(5.3)
Friends support	66.6(20.2)	19(3.9)
significant others support	74.7(19)	4(0.8)

3.4. Correlation Analysis

Entrepreneurial self-efficacy was positively correlated with perceived social support ($r = 0.21$, $P < 0.01$). Weak positive correlations were also observed between entrepreneurial self-efficacy and support from family ($r = 0.19$), friends ($r = 0.18$), and significant others ($r = 0.14$). Age was weakly and negatively correlated with the planning dimension of entrepreneurial self-efficacy ($r = -0.09$, $P < 0.05$) and implementing with financial resources ($r = -0.15$, $P < 0.01$). The correlation coefficients are presented in Table 3.

Table 3
Pearson Correlation Coefficients Between Entrepreneurial Self-Efficacy, Its Dimensions, and Social Support Among Medical Students

Variables	1	2	3	4	5	6	7	8	9	10	11
1. Entrepreneurial self-efficacy	—	.65**	.73**	.75**	.77**	.68**	.21**	.19**	.18**	.14**	−.09
2. Searching		—	.41**	.35**	.27**	.34**	.27**	.21**	.22**	.26**	−.03
3. Planning			—	.55**	.45**	.41**	.17**	.18**	.13**	.11*	−.09*
4. Marshaling				—	.48**	.33**	.20**	.17**	.20**	.17**	−.06
5. Implementing with people					—	.45**	.02	.05	.03	−.04	−.15**
6. Implementing with financial resources						—	.11*	.14**	.07	.03	−.08
7. Social support							—	.87**	.83**	.85**	.08
8. Family support								—	.51**	.67**	.02
9. Friends support									—	.59**	.06
10. significant others support										—	.11*
11. Age											—
*p value < 0.05											
** p value < 0.01											

3.5. Multivariable Linear Regression Analysis

In the revised model, only sex and perceived support from friends remained independently associated with entrepreneurial self-efficacy. Male students had higher entrepreneurial self-efficacy scores than female students (B = 5.68, 95% CI: 3.67–7.70, P < 0.001). Higher perceived support from friends was also associated with higher entrepreneurial self-efficacy scores (B = 0.082, 95% CI: 0.017–0.147, P = 0.014). The model explained 12.1% of the variance in entrepreneurial self-efficacy (adjusted R^2 = 0.121), with VIF values ranging from 1.08 to 2.11. Detailed regression results are presented in Table 4.

3.6. Sensitivity Analysis

The complete-case analysis produced results similar to those of the imputed model. The only significant predictors of entrepreneurial self-efficacy were male gender (B = 6.14, 95% CI: 4.09–8.20, P < 0.001) and support from friends (B = 0.078, 95% CI: 0.018–0.139, P = 0.012), suggesting that the main findings were robust to the methodology used to address missing data (Table 4).

Table 4
Primary multivariable linear regression analysis of factors associated with entrepreneurial self-efficacy based on pooled estimates from 20 multiply imputed datasets (n = 488), with complete-case analysis (n = 379) presented as a sensitivity analysis

Predictor	**Primary analysis (Multiple Imputation, n = 488)**		**P-value**	**Sensitivity analysis (Complete-case, n = 379)**		**P-value**	**VIF**	**Tolerance**
	Adjusted B	**95% CI**		**Adjusted B**	**95% CI**			
Age	-0.195	-0.590 to 0.200	0.331	-0.117	-0.496 to 0.263	0.546	1.08	0.929
Sex)male to female)	**5.684**	**3.669 to 7.698**	**< 0.001**	**6.143**	**4.085 to 8.200**	**< 0.001**	**1.11**	**0.905**
Field of study	0.001	-0.488 to 0.490	0.998	0.037	-0.461 to 0.534	0.885	2.00	0.499
Academic grade	-0.154	-1.508 to 1.201	0.824	0.029	-1.350 to 1.408	0.967	1.99	0.501
Family support	0.061	-0.022 to 0.145	0.148	0.054	-0.023 to 0.132	0.168	1.85	0.541
Friends' support	**0.082**	**0.017 to 0.147**	**0.014**	**0.078**	**0.018 to 0.139**	**0.012**	**1.61**	**0.622**
significant others support	0.031	-0.042 to 0.105	0.400	0.045	-0.029 to 0.120	0.231	2.11	0.474

Model fit

$R^2 = 0.137$; Adjusted $R^2 = 0.121$; $F = 8.40$; $P < 0.001$.

Discussion

The present study found that perceived social support was associated with entrepreneurial self-efficacy (ESE) among medical and allied health students, although the strength of the association differed across support sources. After adjustment for demographic characteristics and the interrelationships among

support sources, only friends' support remained significantly associated with higher ESE, whereas family support and support from significant others were no longer statistically significant. This pattern can be interpreted in light of both Social Cognitive Theory and Social Capital Theory(5, 20). Importantly, because of the cross-sectional design, these findings indicate statistical associations rather than causal effects or established developmental pathways.

From a Social Cognitive Theory perspective, self-efficacy is shaped by sources of efficacy information, including mastery experiences, observational learning, verbal or social persuasion, and interpretations of emotional and physiological states(21, 22). In the context of university education, peer relationships may be particularly relevant because students interact with friends in situations involving shared academic tasks, problem solving, discussion, feedback, and exposure to one another's competencies and behaviors(23). Such interactions may represent more proximal opportunities for observational learning and social persuasion than some other sources of support. Social Capital Theory provides a complementary explanation: peer networks within educational settings may provide access to informational, relational, and instrumental resources that are directly connected to students' academic and entrepreneurial environments(5, 23). Thus, the persistence of the association between friends' support and ESE after adjustment may partly reflect the proximity of peer relationships to students' everyday educational and social learning contexts. These interpretations remain theoretical, however, because the specific forms of learning, feedback, and resources provided by peers were not directly measured.

The loss of statistical significance for family and significant-other support after adjustment may also be considered within these frameworks. Family and significant others may provide important emotional, motivational, and general social resources, but some of their contribution may overlap with the support available through peer networks. In Social Capital Theory, different social networks can provide overlapping or complementary forms of social resources, while Social Cognitive Theory suggests that not all social interactions necessarily provide the same type or proximity of efficacy-relevant information. Consequently, the stronger independent association observed for friends' support may indicate that, in this student population, peer support captures aspects of the social environment more closely related to educational experiences and entrepreneurial self-efficacy. Alternatively, the attenuation of family and significant-other associations may reflect shared variance among support sources or other measured characteristics rather than a true difference in their underlying relevance. Previous studies have likewise reported heterogeneous findings regarding the relative importance of family and peer support in university populations (3, 20, 21, 24–29).Therefore, the present findings should not be interpreted as demonstrating that peer support is inherently more important than family or significant-other support.

The domain-specific pattern of ESE observed in this study provides a further perspective on the findings. Participants reported higher self-efficacy for entrepreneurial tasks related to planning than for implementing with financial resources. From a Social Cognitive Theory perspective, variation in mastery experiences and opportunities for observational learning may contribute to differences in self-efficacy across entrepreneurial domains(13, 21, 30). Healthcare students may encounter greater opportunities for

planning and problem-solving through their academic training, while having fewer opportunities for direct engagement with financial and business decision-making(31–33). Social Capital Theory further suggests that differences in access to domain-specific information, advice, and instrumental resources within educational networks may contribute to variation across ESE dimensions(31). However, these potential sources of variation were not directly assessed, and their contribution to the observed pattern cannot be established. Future research should therefore examine whether entrepreneurship education, experiential learning, and access to domain-specific social resources are associated with different dimensions of ESE among healthcare students.

The observed association between friends' support and ESE is broadly consistent with previous research indicating that social support, educational networks, and interpersonal resources may be relevant to entrepreneurial self-efficacy, although the contribution of specific support sources has varied across populations(3, 20, 21, 24, 26, 27, 29, 34) .

In the present study, family, friends, and significant-other support were examined simultaneously within a multivariable framework, and only friends' support remained independently associated with ESE after adjustment for demographic characteristics and the interrelationships among support sources. This finding is theoretically compatible with Social Cognitive Theory, in which social interaction can provide opportunities for observational learning, feedback, and social persuasion(20, 21), and with Social Capital Theory, which emphasizes the informational, supportive, and collaborative resources embedded in social networks(26). However, these mechanisms were not directly measured in the present study and should therefore be regarded as plausible interpretations rather than demonstrated pathways. Longitudinal and intervention studies are needed to clarify temporal relationships and determine whether peer interactions and related social processes contribute to subsequent changes in ESE.

Male students had significantly higher ESE than female students, consistent with findings from some previous entrepreneurship studies(20, 21, 34–37).This finding represents an observed sex difference and should not be interpreted as evidence that sex itself determines entrepreneurial capability or confidence. Differences in prior mastery experiences, exposure to entrepreneurial role models, social persuasion, and access to entrepreneurial networks may potentially contribute to variation in self-efficacy beliefs(13, 21, 30). However, these factors were not directly assessed in the present study, and their contribution to the observed sex difference cannot be established. Future research should therefore investigate whether differences in entrepreneurial exposure, educational opportunities, role-model access, and social learning experiences are associated with variation in ESE across sexes.

The regression model explained a relatively small proportion of the variance in ESE, indicating that perceived social support represents only one component of a broader set of factors associated with entrepreneurial self-efficacy. This finding is compatible with the multidimensional nature of self-efficacy and with the theoretical perspectives used in this study. Social Cognitive Theory emphasizes reciprocal relationships among personal factors, behavior, and environmental influences(20, 38, 39), whereas Social Capital Theory focuses on the resources embedded in social relationships(5). Other potentially relevant

correlates include entrepreneurship education, psychological capital, entrepreneurial intention, previous entrepreneurial experience, and institutional entrepreneurial climate (30, 40–42).Because several of these factors were not assessed, residual confounding cannot be excluded.

These findings may have implications for health professions education, although they do not provide evidence that peer-based interventions would increase ESE. The independent association between friends' support and ESE suggests that peer relationships may be a relevant component of the educational social environment. In terms of Social Cognitive Theory, educational activities that facilitate peer observation, feedback, collaborative problem solving, and social persuasion could be examined as potential contexts for efficacy-related learning. From a Social Capital Theory perspective, peer-based activities may also facilitate access to information, collaboration, and other social resources relevant to entrepreneurial activities. Accordingly, peer mentoring, interdisciplinary innovation activities, collaborative learning, and student-led entrepreneurship initiatives could be evaluated prospectively to determine whether participation in such activities is associated with subsequent changes in ESE. Their effectiveness cannot be inferred from the present cross-sectional findings.

Strengths and Limitations

This study examined the separate associations of family, friends, and significant-other support with ESE within a unified multivariable framework among healthcare students. A particular strength is the integration of Social Cognitive Theory and Social Capital Theory, which provides complementary perspectives for interpreting how social interactions and social resources may relate to ESE. The use of validated Persian instruments, multiple imputation using Predictive Mean Matching, and complete-case sensitivity analyses further strengthens the statistical analysis.

Several limitations should be considered. First, the cross-sectional design precludes conclusions about temporality or causality; therefore, it cannot be determined whether perceived social support precedes differences in ESE, whether ESE influences perceptions of support, or whether both are influenced by other factors. Second, the study was conducted at a single Iranian university using quota-based convenience sampling, which may limit generalizability to other universities, healthcare disciplines, and cultural settings. Third, all study variables were measured using self-report instruments, which may introduce reporting and common-method bias. Fourth, although multiple sources of social support and demographic characteristics were considered, the relatively low explanatory power of the model suggests that important correlates of ESE may not have been measured. These include entrepreneurship education, previous entrepreneurial experience, psychological capital, entrepreneurial intention, and institutional entrepreneurial climate. Residual confounding therefore remains possible. Finally, the theoretical mechanisms proposed to explain the association between friends' support and ESE, such as observational learning, social persuasion, and access to informational resources, were not directly measured.

Future Research

Future studies should use longitudinal and multicenter designs to clarify the temporal relationships between different sources of perceived social support and ESE across healthcare education settings. In particular, research should examine whether changes in peer, family, or significant-other support are followed by changes in ESE and whether specific forms of peer interaction, such as feedback, role modeling, collaborative problem solving, and access to entrepreneurial information, help explain these relationships.

Future research should also integrate the complementary constructs emphasized by Social Cognitive Theory and Social Capital Theory. Studies could examine personal factors such as psychological capital and prior entrepreneurial experience alongside environmental factors such as entrepreneurship education, institutional entrepreneurial climate, peer networks, and access to entrepreneurial resources. Longitudinal mediation models may help investigate temporal pathways, while structural equation modeling may be useful for testing theoretically specified relationships when supported by an appropriate design. Multilevel approaches may also be informative where students are nested within academic programs or institutions.

Conclusion

Perceived social support was associated with ESE among medical and allied health students, but the strength of the association differed across support sources. After adjustment for demographic characteristics and the interrelationships among support sources, only friends' support remained significantly associated with higher ESE. Viewed through Social Cognitive Theory and Social Capital Theory, this finding may reflect the proximity of peer relationships to students' educational interactions, observational learning, social persuasion, and access to informational and relational resources. However, these mechanisms were not directly measured and cannot be established from the present cross-sectional data. The findings therefore identify friends' support as an independent social correlate of ESE in this population rather than demonstrating a causal effect or establishing that peer support is more important than family or significant-other support. The observed sex difference should similarly be interpreted as an association rather than a causal effect. Longitudinal and intervention research incorporating both personal and social-environmental factors is needed to determine how different forms of social support and educational experiences are temporally related to ESE among healthcare students.

Declarations

Consent for publication : Not applicable.

Availability of data and materials: Data availability on request due to ethical restriction.

Competing interests: The authors declare that they have no competing interests.

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