

Emotional Intelligence and Resilience “PROGRAM” Improves Wellbeing and Stress Management Skills in Preclinical Medical Students

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Purpose: The purpose of this study was to determine if implementation of a new educational curriculum focusing on Emotional Intelligence (EI) and Resilience improved second year medical student scores in these areas.

Methods: Our EI-Resilience curriculum was offered as an elective for second year medical students to voluntarily enroll in. The elective consisted of six 2-hour sessions taught by a single faculty member over eight months. Sessions focused on development of EI skills and teaching a Resilience “PROGRAM” (Positive thinking, Reframing, Optimism, Gratitude, Reflection, Altruism, Meaning). Participants’ EI levels were assessed before and after the elective using the Bar-On Emotional Quotient Inventory 2.0 (EQ-i 2.0).

Results: Over a period of 2 years, 70 students participated in the elective. The overall mean EI score significantly improved after the educational elective (100.05 ± 12.94 versus 108.14 ± 12.36 , $p < 0.001$). Compared to the baseline scores, there was significant improvement in all EI components, including all five composite scales, all fifteen content subscales, and the well-being score (all $p < 0.05$). In a post-intervention survey assessing student perception of the elective, most students found the elective to be helpful (95%, 64/67), most students felt the elective should continue to be available for future students (95%, 64/67), and most would recommend the elective to other students (93%, 62/67).

Conclusion: An EI-Resilience curriculum offered as an elective to second year medical students was well received by students. Our outcomes showed significant improvement in students’ EI scores and all sub-scores, including all components of the stress management composite and well-being score. Teaching EI skills and Resilience strategies in the preclinical setting might be an opportune time for this type of educational intervention.

Keywords: wellness, medical education, curriculum, elective

Introduction

In the ever-evolving landscape of medical education, the focus on holistic development of future physicians has gained increasing attention.^{1,2} In addition to academic excellence, emotional intelligence (EI), resilience, professionalism, and communication skills have emerged as important attributes for healthcare providers, enabling them to navigate the challenges and emotional demands of their profession and provide compassionate patient care.^{3–5}

EI refers to the ability to perceive, understand, and manage emotions, both in oneself and in others. Several models of EI have been proposed, each highlighting different dimensions of this multifaceted construct.^{6–9} Overall, EI encompasses a set of skills that include self-awareness, social awareness, self-management, and relationship management.¹⁰ EI enables individuals to recognize and regulate emotions, develop empathy, and engage in meaningful interpersonal interactions. Resilience is closely linked with EI, and refers to the capacity to withstand adversity, maintain a sense of well-being, and cope with challenges inherent in medical practice.³

Several studies have underscored the importance of EI and resilience in medicine, as both have been associated with improved patient care, reduced burnout, improved job satisfaction, and increased patient satisfaction.^{5,11–15} Therefore, cultivating EI and resilience skills in medical school may positively contribute to patient care and professional fulfillment.

The growing recognition of EI's importance in the development of well-rounded and empathetic future physicians has prompted calls to consider its integration into medical school admissions criteria.⁴ Moreover, the significance of EI in medical education is underscored by its alignment with key competencies emphasized by medical governing bodies, including the Liaison Committee on Medical Education (LCME) and American Council for Graduate Medical Education (ACGME).^{16,17}

Since EI can be taught and improved, educational interventions aimed at teaching these skills have gained increased recognition in medical education.^{18–20} However, it remains unclear how to best incorporate EI training into medical education curricula. Furthermore, despite the growing body of literature on EI in medical education, few formalized curricula exist to hone these skills in medical trainees, especially at the preclinical medical student level. Consequently, there remains a need to further explore EI and resilience interventions at the undergraduate medical education level in order to best harness their potential to allow medical students to thrive in their roles as future physicians.

We aim to address this gap by describing a novel multi-session EI-Resilience curriculum offered as an elective for preclinical medical students. The elective curriculum focused on developing EI skills and teaching a Resilience “PROGRAM” (Positive thinking, Reframing, Optimism, Gratitude, Reflection, Altruism, Meaning). We investigate the impact of this “PROGRAM” on students' EI levels, resilience, and well-being. By focusing on pre-clinical undergraduate medical students, our research offers valuable insights into the potential benefits of introducing EI training early on in medical education. Through this study, we aim to contribute to the growing body of evidence supporting the integration of EI training in medical education, with the ultimate goal of enhancing the well-being and effectiveness of future medical professionals.

Methods

A curriculum for a new elective entitled *Emotional Intelligence-Resilience Elective* was developed and implemented for second-year medical students over the 2021–2022 and 2022–2023 academic years at a US allopathic medical school. The elective consisted of six sessions delivered longitudinally across the year to preclinical students. All incoming second-year medical students were eligible to voluntarily enroll in the elective.

Each session was delivered in-person and lasted two hours in length with additional pre-session and post-session reading, asynchronous lecture recordings, and/or assignments related to each session. Elective sessions were led by one experienced faculty member who facilitated all elective sessions, and two medical students participating in the elective also served as teaching assistants for administrative and logistics coordination.

Each elective session focused on specific topics relevant to EI and resilience, including positive thinking, reframing, optimism, gratitude, reflection, altruism, service, finding meaning and purpose, social support, relationships, mentorship, self-care skills, mindfulness, and self-compassion. Each session also included several self-care and resilience-building post-session exercises and assignments for students to practice building their skills between course sessions (Table 1).

Students completed two surveys at the beginning and end of the curriculum each year. Students were provided their own reports to review for their own personal development and educational benefit as a part of the course curriculum. Prior to group analyses, responses were de-identified by a third-party representative to ensure anonymity and confidentiality.

To evaluate EI and resilience skills, we used the Bar-On Emotional Quotient Inventory 2.0 (EQ-i 2.0[®]) assessment tool, a validated and reliable tool developed to assess the Bar-On model of emotional-social intelligence.²¹ This EI inventory is a 133-item self-report assessment that measure EI using one cumulative score, five composite scores, and 15 content subscale scores. The assessment uses a 5-point Likert scale per item (1=never; 5=always), and scores are standardized to a national mean of 100 and a standard deviation of 15. EI was evaluated using all sections, and the stress management composite score and related content subscales were used as an indicator of resilience skills.

Table 1 Overview of Elective Curriculum

Session	Topic	Post-Session Assignments
1	Emotional Intelligence Overview	Initial EI assessment report reflection
2	Using EI Skills to Develop Resilience	Well-Being indicator reflection
3	Positive thinking, Reframing, Optimism, Gratitude, Reflection, Altruism, Meaning (PROGRAM)	Gratitude Log
4	Finding meaning and purpose, Social support, Relationships, Mentors	Mission Statement, Thank you letter to a mentor
5	Self-Care strategies, Mindfulness and Meditation	Self-Care log
6	Self-Compassion and Course Summary	Self-Reflection essay, Self-Compassion assessment

To evaluate student knowledge of EI skills and use of EI skills in their daily lives, we used an internally developed 10-item survey that used a 5-point Likert scale per item (1=strongly disagree; 5=strongly agree). A post-curriculum survey included five additional items and three free-text comment sections to assess the acceptability and student perception of the elective curriculum.

This study met the criteria for exemption from the Loyola University Chicago Health Sciences Division Institutional Review Board approval; therefore, the requirement for informed consent was waived.

Statistical Analysis

Participants' EI and survey responses are reported as mean with standard deviation stratified by occasion. We used generalized estimating equation (GEE) models to estimate the mean change in EI responses from pre-intervention to post-intervention (adjusted for respondents' sex). In these models, we specified a normal distribution with identity link for each EI construct and used an unstructured matrix to account for the participants' dependent (paired) responses. GEE models were also used to estimate the log odds of stronger agreement to the survey items following the intervention (adjusted for respondents' sex). In these models, we specified a multinomial distribution with cumulative logit link for each ordinal survey item and used robust (empirical) standard errors to account for the participants' dependent (paired) responses. All analyses were completed using SAS version 9.4 (Cary, NC).

Results

A total of 70 medical students participated in the EI-Resilience elective during the 2021–2022 and 2022–2023 academic years. Each medical school class is comprised of 170 students; therefore, 20% (70 of 340) of students participated in the elective during these two academic years. Among the 70 students who completed the preintervention surveys and EI assessment, 96% (67 of 70) completed the curriculum and postintervention surveys, and 97% (65 of 67) completed the EI postintervention assessment.

EI scores for preintervention and postintervention assessments are summarized in [Table 2](#). The preintervention mean total EI was 100.05 ± 12.94 and the postintervention mean was 108.14 ± 12.36 ($p < 0.001$). Compared to the baseline response, there was a significant improvement in all EI scores, including all five composite scales, all fifteen content subscales, and the well-being score (all $p < 0.05$).

Similarly, student understanding and application of EI significantly increased between the preintervention and postintervention period ([Table 3](#); all $p < 0.05$). Students reported higher responses (stronger agreement) in their familiarity with the concept of EI, ability to describe how EI can help them in the clinical setting and how it can be a useful skill for doctors, ability to outline strategies to improve their own EI, and frequency of using EI/resilience strategies and thinking about EI when interacting with others. Higher responses were noted for students' feelings that EI and resilience strategies are an important skill set and in student perception that they have the skills to manage stress and burnout.

Table 2 Change in Emotional Intelligence Scores

	Intervention		Δ (95% CI)	p
	Mean Pre (SD)	Mean Post (SD)		
Total EI	100.05 (12.94)	108.14 (12.36)	8.08 (5.91–10.24)	<0.001
Self-Perception Composite	101.82 (13.25)	108.92 (12.34)	7.11 (5.02–9.20)	<0.001
Self-Regard	95.48 (15.76)	101.32 (13.79)	5.76 (3.60–7.92)	<0.001
Self-Actualization	107.71 (11.29)	112.35 (11.08)	4.76 (2.80–6.72)	<0.001
Emotional Self-Awareness	102.28 (14.22)	110.57 (12.46)	8.39 (5.51–11.26)	<0.001
Self-Expression Composite	94.89 (16.47)	102.88 (14.95)	7.97 (5.83–10.12)	<0.001
Emotional Expression	100.92 (17.67)	108.74 (14.48)	7.82 (5.50–10.13)	<0.001
Assertiveness	94.12 (16.73)	101.17 (16.01)	7.05 (4.92–9.17)	<0.001
Independence	91.91 (14.68)	95.62 (12.99)	3.64 (1.10–6.17)	0.005
Interpersonal Composite	107.28 (11.80)	113.45 (10.34)	6.17 (4.07–8.27)	<0.001
Interpersonal Relationships	102.54 (13.02)	106.60 (11.62)	4.06 (2.23–5.88)	<0.001
Empathy	108.09 (12.82)	114.17 (11.47)	6.04 (3.30–8.79)	<0.001
Social responsibility	108.74 (11.95)	114.35 (9.82)	5.66 (3.58–7.73)	<0.001
Decision Making Composite	97.58 (13.48)	104.85 (12.89)	7.25 (4.62–9.88)	<0.001
Problem Solving	92.75 (13.57)	98.72 (13.49)	5.86 (3.42–8.30)	<0.001
Reality Testing	100.63 (12.82)	108.31 (11.34)	7.71 (4.98–10.44)	<0.001
Impulse Control	101.54 (16.18)	105.32 (15.72)	3.86 (1.01–6.71)	0.01
Stress Management Composite	97.72 (13.04)	104.06 (12.66)	6.30 (3.90–8.71)	<0.001
Flexibility	96.26 (12.50)	102.51 (12.99)	6.19 (3.53–8.85)	<0.001
Stress Tolerance	98.26 (12.58)	103.12 (13.87)	4.90 (2.51–7.29)	<0.001
Optimism	99.80 (13.76)	104.29 (12.74)	4.40 (1.87–6.94)	0.001
Well-Being	100.89 (14.39)	105.28 (11.70)	4.37 (2.18–6.57)	<0.001

Notes: Valid N = 65. CI = Confidence interval for the mean difference, which is adjusted for sex.

Table 3 Change in Survey Response

	Preintervention Mean (n=70)	Postintervention Mean (n=67)	Log Odds (95% CI)	p
I am familiar with the concept of Emotional Intelligence	3.76 (0.89)	4.81 (0.40)	3.25 (2.44–4.07)	<0.001
I can describe how EI can help me in the clinical setting	3.61 (0.97)	4.7 (0.46)	2.76 (1.98–3.54)	<0.001
I understand how EI can be a useful skill for doctors to have	4.23 (0.76)	4.87 (0.34)	2.40 (1.57–3.23)	<0.001

(Continued)

Table 3 (Continued).

	Preintervention Mean (n=70)	Postintervention Mean (n=67)	Log Odds (95% CI)	p
I regularly think about my EI skills when I interact with others	3.24 (1.11)	3.93 (0.70)	3.69 (2.12–6.44)	<0.001
I can outline strategies to improve my own EI level	2.59 (1.03)	4.48 (0.59)	4.04 (3.01–5.08)	<0.001
I recognize how EI skills can promote resilience	3.77 (1.05)	4.81 (0.40)	2.77 (2.11–3.43)	<0.001
I am familiar with specific EI-Resilience strategies	2.36 (1.16)	4.64 (0.54)	4.26 (3.28–5.23)	<0.001
I regularly use EI-Resilience strategies	2.37 (1.13)	4.07 (0.80)	3.00 (2.25–3.76)	<0.001
I feel EI-Resilience strategies are an important skill set	4.19 (0.86)	4.85 (0.36)	2.17 (1.47–2.86)	<0.001
I have the skills to manage stress and burnout	3.31 (0.75)	4.16 (0.75)	2.41 (1.63–3.20)	<0.001

Notes: Mean with standard deviation for the ordinal scale (range 1–5) is displayed, where higher scores reflect stronger agreement with the item. The change in the log odds of a higher response (stronger agreement) is also displayed with 95% confidence limits (CI), which is adjusted for sex. Significance values (p-values) are based on a valid sample size of N = 67.

In the postintervention evaluation survey, most students (n = 64/67 or 95.5%) stated that the elective should be continued (Table 4). Most students (n = 64/67 or 95.5%) also reported that they plan to use what they learned in the course in the future, and many (n = 60/67 or 89.6%) agreed or strongly agreed that they learned new ways to approach stress and burnout through the elective curriculum. Most students (n = 64/67 or 95.5%) also found the elective helpful and would recommend (n = 62/67 or 92.5%) the elective to other students.

In the open-ended feedback on the curriculum, participants praised the elective for the opportunities to reflect individually and in group settings, commenting that

being able to intentionally have time and space for these reflections will be sure to serve [students] in [the] future as a person, as a medical student, and as a future physician.

Students commented that they “learned multiple facets to handle burnout and fatigue, demonstrate more resilience, and adopt more strategies for self-care and compassion.” Students also commented on the assignments, stating that they were “so simple but so effective” in facilitating “active reflection, mindfulness, and self-care.” Students noted the course

Table 4 Postintervention Evaluation Questions

	Strongly Disagree/ Disagree	Neutral	Strongly Agree/ Agree
I plan to use what I have learned in this EI-Resilience Elective in the future.	0 (0.0%)	3 (4.5%)	64 (95.5%)
Through this elective I have learned new ways to approach stress and burnout.	3 (4.5%)	4 (6.0%)	60 (89.6%)
I found this EI-Resilience elective to be helpful.	1 (1.5%)	2 (3.0%)	64 (95.5%)
This EI-Resilience elective should be continued.	2 (3.0%)	1 (1.5%)	64 (95.5%)
I would recommend this EI-Resilience elective to other students.	2 (3.0%)	3 (4.5%)	62 (92.5%)

Notes: Valid N = 67. Count with proportion is displayed.

sessions could be improved by allowing for more discussion time and group activities into elective sessions, and providing more resources and reading materials for those interested in learning more about EI and resilience topics.

Discussion

In this study, we implemented an Emotional Intelligence-Resilience curriculum as an elective for preclinical second-year medical students. The curriculum integrated small group reflection activities, take-home assignments, and didactic lectures to enhance EI skills. Our results demonstrate that the intervention was well received by students. We found significant improvements in EI scores and all sub-scores, including all components of the stress management composite and well-being score. Our findings demonstrate that educational interventions can effectively improve EI in medical students, and suggests that EI and resilience skills can be improved in this population.

To our knowledge, this is the first study that has investigated the impact of an EI-Resilience curricular intervention in preclinical undergraduate medical students. Comparing our study with existing literature in undergraduate and graduate medical education, we note several similarities and differences in both interventions and outcomes. Studies in residents across specialties have shown varying outcomes in EI after specific interventions to teach EI and resilience skills. Some studies have shown increases in EI scores, resilience measures, or related outcomes whereas several others have had no differences or even decreases in EI associated outcomes at following curricular interventions.^{22–25} Similarly, studies in medical students show varying degrees of improvements in EI, wellbeing, or resilience at the end of different interventions.^{26–31} It is important to note that variability in interventions, study populations, and outcomes measured make it difficult to directly compare our study with prior literature.

We postulate that several unique aspects of our study design may have contributed to its success in improving EI and related resilience scores across all measured outcomes. Firstly, our curriculum was delivered in the preclinical phase, specifically to second-year medical students. Research previously suggests that the third-year of medical school stage of medical education may be an ideal “sweet spot” to teach EI skills.^{32,33} Here, we show that this ‘sweet spot’ may even be as early as preclinical years of medical school when students’ willingness to engage in an EI curriculum may contribute to its effectiveness. Another factor that might have contributed to the success of our intervention was the use of self-selected participants. Students who enrolled in the elective may have had a prior interest in or motivation to learn about EI and resilience. This self-selection process could have resulted in a more engaged and receptive cohort, which may have amplified the curriculum’s impact. Furthermore, the longitudinal nature of the course, spanning the entire academic year, allowed for consistent exposure to EI concepts, potentially reinforcing learning points and fostering deeper integration of EI skills.

However, we must acknowledge several limitations of our study. First, in this single-arm design, the lack of a control group limits the internal validity of the intervention’s effects and we are unable to adequately determine how EI scores may have differed in a group of students who did not receive the EI and resilience “PROGRAM” intervention. Second, the single-institution study design with a relatively small sample size may restrict the generalizability of the findings to other medical schools. Replicating the study using larger samples across multiple institutions would provide more robust evidence of the intervention’s effectiveness. Moreover, the voluntary enrollment of participants may introduce selection bias, potentially influencing the study’s outcomes. Implementing this curriculum as a mandatory component of the medical school curriculum might offer a different perspective on the impact of the intervention, as other studies have done.^{25,30} Further, the cost of the EI assessment tool used to evaluate EI and resilience skills may be a financial consideration in scaling this study to a greater sample size. Exploring alternative assessment tools may be beneficial to assess the feasibility of implementing similar interventions on a larger scale.

Looking ahead, future research could focus on assessing the long-term efficacy and lasting effects of our EI and resilience “PROGRAM” on participants’ EI. Exploring whether the improvements in EI observed in preclinical years have lasting effects during clinical training and subsequent medical careers could provide valuable insights into the long-term retention of EI skills and their benefit to clinical contexts.

Conclusion

In conclusion, our study demonstrates a positive impact of a novel EI-Resilience curriculum on preclinical medical students. Teaching EI skills and resilience strategies through a structured “PROGRAM” in the preclinical setting might be an opportune time for this type of educational intervention. We encourage further research to explore the effectiveness of similar interventions across different stages of medical training and diverse student populations. Understanding the long-term effects of EI training on medical students and its influence on their future professional development is essential for fostering emotionally intelligent and resilient physicians.

Ethics Approval and Informed Consent

This study met the criteria for exemption from Institutional Review Board approval; therefore, the requirement for informed consent was waived.

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Author Contributions

All authors made a significant contribution to the work reported, whether that is in the conception, study design, execution, acquisition of data, analysis, and interpretation, or in all these areas; took part in drafting, revising, or critically reviewing the article; gave final approval of the version to be published; have agreed on the journal to which the article has been submitted; and agreed to be accountable for all aspects of the work.

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