


# Sustained Impact of an Emotional Intelligence and Resilience Curriculum for Medical Students

Lauren N Jennings <sup>1</sup>, Marina Feffer<sup>2</sup>, Ramzan Shahid<sup>1,3</sup>

<sup>1</sup>Loyola University Chicago, Stritch School of Medicine, Maywood, IL, USA; <sup>2</sup>Department of Clinical Research, Loyola University Chicago, Maywood, IL, USA; <sup>3</sup>Department of Pediatrics, Stritch School of Medicine, Loyola University Medical Center, Maywood, IL, USA

Correspondence: Ramzan Shahid, Department of Pediatrics, Loyola University Chicago, Stritch School of Medicine, 2160 South First Ave, Maywood, IL, 60153, USA, Tel +1 708 327 9125, Fax +1 708327 9132, Email [rshahid@lumc.edu](mailto:rshahid@lumc.edu)

**Purpose:** The purpose of this study was to assess the effectiveness of an educational curriculum focused on Emotional Intelligence (EI) and Resilience among second-year medical students, with emphasis on evaluating the retention of EI skills one year following the curricular intervention.

**Methods:** Second-year medical students voluntarily participated in an EI-Resilience elective with a curriculum consisting of six sessions aimed at teaching EI and resilience skills. Participants underwent assessment before, immediately after, and one year following the intervention, utilizing the Bar-On Emotional Quotient Inventory 2.0 (EQ-i 2.0). Survey responses were averaged and compared between varying time points.

**Results:** Thirty students completed the EQ-i 2.0 assessments at three time points: prior to, immediately after, and one-year following the educational intervention. A comparison of mean EI scores pre- and immediate post-intervention showed a significant increase in most components of EI. No significant changes were detected between the immediate post-test and 1-year post-test on any EI components, except for a noteworthy increase in the mean Interpersonal Relationship score. Students demonstrated an average increase in their Interpersonal Relationship skills of 5.7 points (95% CI: 3.0, 8.4,  $p < 0.001$ ) at the one-year post-test compared to the post-test immediately following the intervention. Students reported continued satisfaction and usefulness one-year post-intervention as demonstrated by an internally developed survey. In the one-year post-intervention survey, most students used what they had learned in the elective during their third year (91%, 32/35) and all students found the elective to be applicable during their third year. In free-text responses, students reported improved coping and reflection skills in the third year of medical school following the intervention.

**Conclusion:** An EI-Resilience curriculum offered as an elective to second-year students continued to be well-received one year following the educational intervention. Data suggests that enhanced EI and resilience skills were sustained over a one-year period following the educational intervention.

**Keywords:** emotional intelligence, resilience, emotional intelligence-resilience curriculum, medical students, longitudinal study, sustained outcomes

## Introduction

Over the past decade, there has been a notable surge in attention towards creating and sustaining wellness programs for medical trainees.<sup>1,2</sup> Emphasis on emotional intelligence (EI), resilience, professionalism and communication skills remain at the forefront of these initiatives.<sup>3-6</sup>

Emotional intelligence encompasses the ability to recognize, understand, and interpret personal and interpersonal emotions.<sup>7-10</sup> Key facets of EI include self-perception, self-expression, interpersonal relations, decision-making and stress management.<sup>9,11,12</sup> Notably, resilience skills are intertwined with EI, and improvements in resilience skills have been linked to improvements in overall wellness.<sup>3</sup> Resilience may protect professionals from stressors that could lead to burnout.<sup>5</sup> Medical students can benefit from resilience training to allow them to better cope with the stressors of medical education and future clinical practice.

Several studies demonstrate the impact of robust EI and resilience skills on mitigating burnout, improving the quality and satisfaction of patient care, and fostering greater job satisfaction among medical students and residents.<sup>13–23</sup> This recognition of EI's significance is reflected in the incorporation of such competencies in medical school admissions criteria and integration of EI initiatives into residency training programs.<sup>4,13,16–18</sup> Governing bodies in medical education, including the Liaison Committee on Medical Education (LCME) and American Council for Graduate Medical Education (ACGME), underscore the importance of EI proficiency for medical trainees.<sup>24,25</sup>

Empirical evidence demonstrates the feasibility and efficacy of interventions aimed at teaching and enhancing EI skills, with studies suggesting that interventions conducted prior to the third year of medical school may represent an ideal opportunity for skills cultivation.<sup>26–29</sup> Despite these advances, longitudinal studies assessing the impact of EI interventions are sparse. Minimal existing research does indicate a positive association between administration of an EI intervention and sustained increases in EI skills, patient satisfaction and application of EI skills among surgical residents.<sup>17</sup> In relation to medical students, little information pertaining to the longitudinal effects exists, signaling an essential area for further study. A recent study by Versel et al showed an EI curriculum targeting second year medical students was well received and demonstrated an increase in their EI scores and resilience immediately following completion of the course.<sup>26</sup> Currently, no other studies in the literature explore the longitudinal effect of an EI intervention in medical students. Our study aims to evaluate the longitudinal impact of this EI curriculum by assessing EI scores one year following course completion in medical students.

## Methods

An elective program entitled Emotional Intelligence-Resilience Elective was implemented for second-year medical students over the 2021–2022 and 2022–2023 school year at a US allopathic medical school. Participation in the elective was open to all second-year students on a voluntary basis. The program consisted of six in-person sessions conducted by an expert faculty member, with each session spanning approximately two hours. 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. In addition to attendance at these sessions, students completed pre- and post-session readings and lectures, engaged in self-care and resilience-building exercises, and provided written reflections. The six sessions were conducted longitudinally over the academic year.

To gauge the efficacy of the curriculum, two surveys were administered to students at three time points: beginning of the course, end of the course, and one-year following the course. Prior to group analyses, responses were de-identified by a third-party representative to ensure anonymity and confidentiality. One survey used was the Bar-On Emotional Quotient Inventory 2.0 (EQ-i 2.0<sup>®</sup>) assessment tool, a validated tool assessing the Bar-On model of emotional-social intelligence.<sup>11</sup> This EI survey encompassed 133 self-reported items utilized to compute one cumulative EI score, five composite scores, and 15 content subscale scores. Item scoring consists of a 5-point Likert scale (1=never; 5=always) and scores are standardized to a national mean of 100 with a standard deviation of 15.<sup>11</sup> Since resilience is the ability of an individual to respond to stress, resilience skills were assessed based on the stress management composite score and the subscales contributing to stress management.<sup>22</sup> EI skills were evaluated using all sections and subsections. Students received their personalized EI reports to facilitate reflection and growth as part of the course curriculum. The second survey consisted of 10 items that evaluated students' understanding and utilization of EI skills, scored with a 5-point Likert scale (1=strongly disagree; 5=strongly agree). This internally designed survey also included a free-text comment section as part of the post-course evaluation. Prior to group analysis, responses were de-identified by a third-party representative to ensure anonymity and confidentiality.

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

## Statistical Methods

Survey responses from pre-, post-, and 1-year post-course were compared to assess estimated mean changes in the cumulative EI score, the five composite scores, and the 15 content subscale scores. Generalized estimated equations

(GEE) were used to compare pre- to post-course, pre- to 1-year post-course, and post- to 1-year post-course. Models were specified with a normal distribution and identity link for each EQI construct, with an unstructured correlation matrix to account for participant's dependent (paired) responses and adjusted for respondent's sex. Additionally, mixed ordinal logistic models were used to estimate the log odds of higher response (greater agreement) among the 10 items that evaluated students' understanding and utilization of EI skills pre- versus post-course, pre- versus 1-year post-course, and post- versus 1-year post-course, adjusted for respondent's sex. Mixed ordinal logistic models were specified with robust standard errors and an unstructured covariance matrix to account for respondent's dependent (paired) responses. All analyses were conducted via Stata v.18, are two-sided, and have a threshold for significance of  $p < 0.05$ .

## Results

A total of 70 students participated in the EI-Resilience elective over the two years. 30 of these seventy students completed all of the surveys at the three time points (response rate = 43%, 30/70). An additional five students completed the one-year postintervention internal survey but did not complete the EI survey at that time point.

Mean EI scores at baseline, post-intervention, and one-year post-intervention are detailed in Tables 1–3. In Table 1, a comparison of mean EI scores pre- and post-intervention showed a significant increase in all components of EI (all

**Table 1** Comparison of Mean Emotional Intelligence Between Pre- and Post-Intervention

	Mean Pre (SD)	Mean Post (SD)	Δ (95% CI)	P
<b>Total EI</b>	97.2 (10.4)	105.5 (10.9)	8.3 (4.8, 11.9)	<0.001
<b>Self-Perception Composite</b>	100.2 (11.4)	108.1 (10.6)	7.9 (4.6, 11.3)	<0.001
Self-Regard	94.4 (13.9)	99.4 (13.0)	5.0 (1.3, 8.7)	0.009
Self-Actualization	107.9 (10.8)	112.9 (11.1)	5.0 (2.7, 7.2)	<0.001
Emotional Self-Awareness	98.4 (12.4)	109.9 (10.2)	11.5 (6.8, 16.2)	<0.001
<b>Self-Expression Composite</b>	91.2 (14.3)	98.9 (14.8)	7.8 (4.8, 10.8)	<0.001
Emotional Expression	97.4 (14.5)	106.4 (13.3)	9.0 (5.0, 13.0)	<0.001
Assertiveness	91.7 (18.0)	98.2 (16.9)	6.5 (5.7, 7.4)	<0.001
Independence	89.4 (15.1)	91.6 (14.5)	2.2 (−1.6, 6.1)	0.253
<b>Interpersonal Composite</b>	105.8 (11.9)	112.1 (8.8)	6.3 (4.1, 8.5)	<0.001
Interpersonal Relationships	100.2 (11.7)	104.0 (11.2)	3.8 (1.9, 5.7)	<0.001
Empathy	107.8 (13.3)	113.7 (10.0)	5.9 (3.0, 8.7)	<0.001
Social responsibility	107.5 (14.0)	114.0 (10.6)	6.5 (4.1, 9.0)	<0.001
<b>Decision Making Composite</b>	94.9 (12.9)	102.5 (12.9)	7.6 (2.8, 12.4)	0.002
Problem Solving	89.9 (13.7)	96.1 (14.6)	6.2 (2.0, 10.4)	0.003
Reality Testing	100.1 (11.7)	108.0 (10.1)	7.9 (3.4, 12.4)	0.001
Impulse Control	98.5 (17.0)	103.0 (14.2)	4.5 (−0.1, 9.1)	0.057
<b>Stress Management Composite</b>	94.8 (10.5)	100.9 (12.4)	6.1 (2.2, 10.0)	0.002
Flexibility	92.4 (12.2)	99.6 (12.7)	7.3 (3.6, 10.9)	<0.001
Stress Tolerance	97.3 (11.6)	102.0 (15.7)	4.7 (0.4, 9.0)	0.032
Optimism	97.2 (10.0)	100.6 (13.2)	3.4 (−0.7, 7.4)	0.101
<b>Well-Being</b>	97.6 (13.0)	103.4 (11.3)	5.8 (2.2, 9.3)	0.002

**Notes:** Valid N = 30. SD = Standard deviation of the mean. Δ = Mean difference with 95% confidence interval, adjusted for sex.

**Table 2** Comparison of Mean Emotional Intelligence Between Pre- and 1-Year Post-Intervention

	Mean Pre (SD)	Mean 1 Year Post (SD)	$\Delta$ (95% CI)	P
<b>Total EI</b>	97.2 (10.4)	107.1 (11.2)	9.9 (5.6, 14.3)	<0.001
<b>Self-Perception Composite</b>	100.2 (11.4)	108.7 (11.5)	8.5 (3.8, 13.3)	<0.001
Self-Regard	94.4 (13.9)	99.5 (14.6)	5.1 (0.4, 9.7)	0.033
Self-Actualization	107.9 (10.8)	113.9 (9.2)	6.0 (1.8, 10.1)	0.005
Emotional Self-Awareness	98.4 (12.4)	110.2 (13.8)	11.8 (6.9, 16.7)	<0.001
<b>Self-Expression Composite</b>	91.2 (14.3)	99.0 (14.8)	7.9 (2.3, 13.4)	0.005
Emotional Expression	97.4 (14.5)	105.1 (16.3)	7.6 (2.7, 12.6)	0.003
Assertiveness	91.7 (18.0)	98.1 (13.6)	6.4 (1.6, 11.2)	0.010
Independence	89.4 (15.1)	93.3 (15.1)	4.0 (-1.6, 9.5)	0.159
<b>Interpersonal Composite</b>	105.8 (11.9)	115.5 (7.3)	9.7 (6.9, 12.5)	<0.001
Interpersonal Relationships	100.2 (11.7)	109.7 (9.1)	9.5 (6.8, 12.2)	<0.001
Empathy	107.8 (13.3)	114.9 (9.5)	7.1 (3.7, 10.5)	<0.001
Social responsibility	107.5 (14.0)	115.6 (8.5)	8.1 (4.5, 11.7)	<0.001
<b>Decision Making Composite</b>	94.9 (12.9)	103.7 (16.1)	8.8 (4.1, 13.6)	<0.001
Problem Solving	89.9 (13.7)	97.3 (16.1)	7.4 (2.6, 12.3)	0.003
Reality Testing	100.1 (11.7)	109.0 (9.9)	8.8 (3.8, 13.8)	0.001
Impulse Control	98.5 (17.0)	103.5 (17.4)	5.0 (1.3, 8.7)	0.008
<b>Stress Management Composite</b>	94.8 (10.5)	102.8 (11.2)	7.9 (3.5, 12.3)	<0.001
Flexibility	92.4 (12.2)	102.5 (10.1)	10.2 (6.6, 13.8)	<0.001
Stress Tolerance	97.3 (11.6)	101.8 (13.5)	4.5 (-0.3, 9.3)	0.065
Optimism	97.2 (10.0)	102.8 (11.9)	5.5 (0.6, 10.5)	0.028
<b>Well-Being</b>	97.6 (13.0)	102.7 (12.9)	5.0 (0.4, 9.7)	0.033

**Notes:** Valid N = 30. SD = Standard deviation of the mean.  $\Delta$  = Mean difference with 95% confidence interval, adjusted for sex.

$p < 0.05$ ), except Independence ( $p = 0.253$ ), Impulse Control ( $p = 0.057$ ), and Optimism ( $p = 0.101$ ). Table 2 demonstrates all EI measures had significantly higher scores at the one-year post-intervention follow-up compared to pre-intervention responses (all  $p < 0.05$ ), except for independence ( $p = 0.159$ ) and stress tolerance ( $p = 0.065$ ).

As seen in Table 3, no significant changes were observed in EI components between the immediate post-intervention assessments and the one-year follow-up assessments, except for a noteworthy increase in the mean Interpersonal Relationship score. Students reported a mean increase in their Interpersonal Relationship skills of 5.7 points (95% CI: 3.0, 8.4,  $p < 0.001$ ) at one-year post-intervention assessment compared to the immediate post-intervention evaluation.

Responses to the internally developed survey assessing familiarity with and utility of EI skills are reported in Table 4. In comparison to baseline, students expressed significantly greater agreement with all survey items at both immediate post-intervention and one-year post-intervention assessments. Comparing student responses between the immediate post-intervention and one-year post-intervention, no significant changes are detected, with exception of students reporting significantly higher agreement on the item “I regularly think about my EI skills when I interact with others” ( $p < 0.001$ ), and students reporting decreased agreement on items “I recognize how EI skills can promote resilience” and “I am familiar with specific EI-Resilience strategies” ( $p = 0.011$ , and 0.004, respectively).

**Table 3** Comparison of Mean Emotional Intelligence Between Post- and 1-Year Post-Intervention

	Mean Post (SD)	Mean 1 Year Post (SD)	$\Delta$ (95% CI)	P
<b>Total EI</b>	105.5 (10.9)	107.1 (11.2)	1.6 (−1.4, 4.6)	0.298
<b>Self-Perception Composite</b>	108.1 (10.6)	108.7 (11.5)	0.6 (−2.1, 3.3)	0.667
Self-Regard	99.4 (13.0)	99.5 (14.6)	0.1 (−3.1, 3.2)	0.967
Self-Actualization	112.9 (11.1)	113.9 (9.2)	1.0 (−1.7, 3.7)	0.460
Emotional Self-Awareness	109.9 (10.2)	110.2 (13.8)	0.3 (−3.4, 4.0)	0.873
<b>Self-Expression Composite</b>	98.9 (14.8)	99.0 (14.8)	0.1 (−4.8, 5.0)	0.968
Emotional Expression	106.4 (13.3)	105.1 (16.3)	−1.3 (−5.8, 3.1)	0.556
Assertiveness	98.2 (16.9)	98.1 (13.6)	0.1 (−7.8, 8.1)	0.973
Independence	91.6 (14.5)	93.3 (15.1)	1.7 (−3.9, 7.3)	0.545
<b>Interpersonal Composite</b>	112.1 (8.8)	115.5 (7.3)	3.4 (0.0, 6.8)	0.050
Interpersonal Relationships	104.0 (11.2)	109.7 (9.1)	5.7 (3.0, 8.4)	<0.001
Empathy	113.7 (10.0)	114.9 (9.5)	1.2 (−3.0, 5.4)	0.566
Social responsibility	114.0 (10.6)	115.6 (8.5)	1.6 (−2.1, 5.3)	0.392
<b>Decision Making Composite</b>	102.5 (12.9)	103.7 (16.1)	1.2 (−2.0, 4.5)	0.460
Problem Solving	96.1 (14.6)	97.3 (16.1)	1.2 (−2.0, 4.5)	0.454
Reality Testing	108.0 (10.1)	109.0 (9.9)	0.9 (−3.6, 5.5)	0.689
Impulse Control	103.0 (14.2)	103.5 (17.4)	0.5 (−2.9, 4.0)	0.764
<b>Stress Management Composite</b>	100.9 (12.4)	102.8 (11.2)	1.9 (−1.0, 4.7)	0.196
Flexibility	99.6 (12.7)	102.5 (10.1)	2.9 (−1.0, 6.8)	0.148
Stress Tolerance	102.0 (15.7)	101.8 (13.5)	−0.2 (−2.5, 2.0)	0.841
Optimism	100.6 (13.2)	102.8 (11.9)	2.2 (−0.8, 5.2)	0.158
<b>Well-Being</b>	103.4 (11.3)	102.7 (12.9)	−0.7 (−4.5, 3.1)	0.704

**Notes:** Valid N = 30. SD = Standard deviation of the mean.  $\Delta$  = Mean difference with 95% confidence interval, adjusted for sex.

In the one-year post-intervention survey (Table 5), 91% of students agreed or strongly agreed that they used what they had learned in the EI-Resilience Elective during their third year. Additionally, all students agreed or strongly agreed that they found the EI-Resilience elective to be applicable during their third year and that the EI-Resilience elective should be continued.

In the free-text comment section of the curriculum evaluation, students found the skills taught in the course to be beneficial one year afterwards during their third year of medical school. One student commented,

During certain aspects of setbacks in my third year, I often reflected on this course in order to help navigate and provide encouragement to keep going even in the setting of obstacles.

Another student wrote,

It is easy to fall into a mindset of ingratitude and frustration with the heavy workload of third year. This course taught me gratitude and coping mechanisms.

**Table 4** Change in Internally Developed Survey Responses at Various Follow-Up Times

	Pre vs Post		Pre vs 1 Year		Post vs 1 Year	
	Log Odds (95% CI)	p	Log Odds (95% CI)	p	Log Odds (95% CI)	p
I am familiar with the concept of Emotional Intelligence	4.9 (2.4, 7.3)	<0.001	4.6 (2.6, 6.6)	<0.001	-0.3 (-1.5, 0.9)	0.667
I can describe how EI can help me in the clinical setting	4.5 (2.6, 6.4)	<0.001	4.3 (2.4, 6.2)	<0.001	-0.2 (-1.3, 0.9)	0.743
I understand how EI can be a useful skill for doctors to have	3.0 (1.5, 4.5)	<0.001	3.4 (1.9, 4.8)	<0.001	0.3 (-1.4, 2.1)	0.707
I regularly think about my EI skills when I interact with others	2.3 (1.1, 3.4)	<0.001	4.2 (3.1, 5.2)	<0.001	1.9 (1.0, 2.8)	<0.001
I can outline strategies to improve my own EI level	4.6 (3.0, 6.2)	<0.001	4.2 (2.8, 5.6)	<0.001	-0.4 (-1.4, 0.6)	0.404
I recognize how EI skills can promote resilience	4.4 (3.0, 5.9)	<0.001	3.4 (1.9, 4.9)	<0.001	-1.0 (-1.8, -0.2)	0.011
I am familiar with specific EI-Resilience strategies	5.1 (3.6, 6.6)	<0.001	3.6 (2.4, 4.9)	<0.001	-1.4 (-2.4, -0.5)	0.004
I regularly use EI-Resilience strategies	4.8 (3.8, 5.9)	<0.001	4.6 (3.3, 5.8)	<0.001	-0.3 (-1.3, 0.7)	0.587
I feel EI-Resilience strategies are an important skill set	3.6 (1.6, 5.5)	<0.001	3.0 (1.5, 4.6)	<0.001	-0.5 (-2.1, 1.0)	0.500
I have the skills to manage stress and burnout	3.9 (2.3, 5.4)	<0.001	3.9 (2.5, 5.4)	<0.001	0.0 (-0.7, 0.8)	0.936

**Notes:** Valid N = 30. The change in the log odds of a higher response (stronger agreement) is displayed with 95% confidence limits (CI), adjusted for sex.

**Table 5** One-Year Post Intervention Evaluation Questions

	Strongly Disagree/ Disagree	Neutral	Strongly Agree/ Agree
I used what I have learned in this EI-Resilience Elective during my third year	0 (0.0%)	3 (8.6%)	32 (91.4%)
Through this elective I have learned new ways to approach stress and burnout.	0 (0.0%)	3 (8.6%)	32 (91.4%)
I found the EI-Resilience elective to be applicable during my third year	0 (0.0%)	0 (0.0%)	35 (100%)
This EI-Resilience elective should be continued.	0 (0.0%)	0 (0.0%)	35 (100%)
I would recommend this EI-Resilience elective to other students.	0 (0.0%)	1 (2.8%)	34 (97.2%)

**Notes:** Valid N = 35. Count with proportion is displayed.

## Discussion

An Emotional-Intelligence Resilience curriculum was implemented as a voluntary elective for second-year medical students. The curriculum comprised six sessions aimed at enhancing EI skills supplemented with assignments designed to bolster EI skills. Subsequently, students progressed throughout the third year of medical school in a predominantly clinical curriculum, as is standard for allopathic medical schools. Students did not receive any further EI interventions in the third year.

The overall EI score, most EI subcomponents, and Well-Being scores significantly increased immediately following completion of the course. This is consistent with a previous study using this EI curriculum.<sup>26</sup> When examining the longitudinal outcomes of the curriculum, no significant changes were detected in most of the EI components between the immediate post-test and 1-year post-test time periods. This suggests that the EI and resilience skills gained through the educational intervention were maintained longitudinally as students progressed through their third year of medical school. Interestingly, a significant increase in the Interpersonal Relationship component was detected, suggesting this area of EI continued to improve beyond the intervention. Since the clinical year integrates a student into a patient care team and develops patient communication skills, the increase in interpersonal relationships may be related to these interactions.

The reported findings demonstrate that one-year post intervention, students regularly think about their EI skills when interacting with others. Regularly considering EI skills can allow students to interact and communicate with others in a professional manner.<sup>3–6</sup> Interestingly, students did have a decrease in their ability to recognize how EI skills can promote resilience and a decreased familiarity with EI and resilience strategies. These findings highlight the need for doing a brief reminder educational session during the third of year medical school in order to sustain the maximal benefits of the initial intervention.

Overall, results demonstrate the intervention continued to be well-received by students, even after completing third year of medical school. The comments from students suggest teaching EI and resilience prior to clinical years can be crucial to their success in the clinical setting. Students applied the skills they had learned in the elective during their third year and would like to see the elective be available for other students in the future.

Currently, no other studies in the literature explore the longitudinal effect of an EI intervention in medical students. Few studies demonstrate varying effects of an EI intervention in medical education, though such studies differ in design, implementation, population, and outcome measures.<sup>13,16–18,26,30–38</sup>

The third year of medical school marks a unique transition for medical students, in which students enter the clinical setting and are faced with challenging clinical scenarios, dynamic team interactions, career planning pressures, and time management demands.<sup>35–37,39,40</sup> Students routinely demonstrate decreased comfort and preparedness for these challenges.<sup>39,40</sup> Previous research demonstrates successful implementation of an EI-Resilience curriculum to improve EI and resilience skills prior to the start of the third-year.<sup>26,37,38</sup> Our findings indicate no significant changes immediately following the EI-Resilience intervention compared to assessments at the end of the third year. Given the unique challenges of the third year, these results highlight the longitudinal and sustained effects of an EI-intervention prior to the third-year.

The success of the intervention may be attributed to a variety of factors. Since students self-enrolled in the curriculum, these students may have had prior interest or experiences related to EI. Self-selection may have contributed to a more engaged and receptive cohort. Student reception may translate into more frequent implementation of learned EI skills following the intervention in the third year of medical school. Given the growing interest in EI and resilience in undergraduate and graduate medical education, faculty involved in teaching medical students in the third year may be more aware of EI skills and may more readily engage students in these discussions and strategies.

## Limitations

Several limitations to this study exist. This study consists of a single-arm design without a control group, therefore limiting the generalizability and validity of the longitudinal effects. Furthermore, the study was conducted at a single institution with a relatively small sample size, further restricting generalizability to other undergraduate medical students or graduate medical residents. Our relatively low response rate at the 1-year post course follow-up may limit our generalizability, especially if those who did not respond would have had responses that vary from those who did. As discussed previously, students self-selected to voluntarily participate in the elective intervention. This self-selection possibly introduces selection bias, which may be mitigated by mandatory enrollment or mandatory assessment of EI and resilience skills. Finally, several students failed to complete the one-year post-intervention assessment, resulting in a decreased sample size and possible attrition bias.

Future research should center upon the studying these outlined effects in a larger sample size. Implementation of an EI-Resilience curriculum on a larger scale may afford opportunities to tailor EI interventions to the unique challenges of undergraduate medical students. The ongoing longitudinal effects of an EI intervention should be continuously assessed as students progress through the fourth year and onto graduate medical education. This ongoing assessment may reveal unique time points for refreshing EI and resilience strategies. Additionally, future research could include a control group so there may be a comparison between students who do and do not enroll in the EI course.

## Conclusion

In conclusion, the implementation of an Emotional Intelligence-Resilience curriculum as a voluntary elective for second-year medical students demonstrated promising results in enhancing EI and resilience skills over a sustained period. This



study contributes to the minimal literature examining the longitudinal and sustained effects of EI interventions in medical education, highlighting the potential for interventions to teach essential skills for navigating the clinical and interpersonal challenges faced in medical training. EI and resilience training for early medical students could help them maintain well-being and reduce burnout as they transition into the stressors of a clinical setting. Future research should expand on these findings to further elucidate the impacts and optimal timing of EI interventions in medical education.

## Ethics Approved and Informed Consent

The study met criteria for exemption as determined by the Loyola University Chicago Health Sciences Division Institutional Review Board and the requirement for informed consent was waived.

## Acknowledgments

The authors gratefully acknowledge Gregory Gruener, MD, MBA, MHPE, FANA, Vice Dean for Education at Loyola University Chicago Stritch School of Medicine, and Claudia Kubnick, Executive Assistant to Gregory Gruener, for their invaluable support of the Emotional Intelligence-Resilience Elective. The authors thank Julia Versel, MD, Alexandra Plezia, MD, and Isaac Sontag-Milobsky, BA for their contributions to the Emotional Intelligence-Resilience Elective.

## Author Contributions

All authors contributed significantly to this work, including conception, study design, data acquisition, analysis, interpretation, drafting, revising, and critically reviewing the article. Each author provided final approval of the version to be published, selected the journal for submission, and agreed to be accountable for all aspects of the work.

## Funding

This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

## Disclosure

The authors report no conflicts of interest in this work.

## References

1. Cherry MG, Fletcher I, O'Sullivan H, Shaw N. What impact do structured educational sessions to increase emotional intelligence have on medical students? *BEME guide no. 17. Med Teach.* 2012;34(1):11–19. doi:10.3109/0142159X.2011.614293
2. Kaplan-Liss E, Lantz-Geffroh V, Bass E, et al. Teaching medical students to communicate with empathy and clarity using improvisation. *Acad Med.* 2018;93(3):440–443. doi:10.1097/ACM.0000000000002031
3. Boateng A, Aslakson R. Elisabeth Kübler-Ross as astrophysicist: emotional intelligence and resilience unlock the black hole of physician burnout, moral distress, and compassion fatigue. *Am J Bioeth.* 2019;19(12):54–57. doi:10.1080/15265161.2019.1674423
4. Emanuel EJ, Gudbranson E. Does medicine overemphasize IQ? *JAMA.* 2018;319(7):651–652. doi:10.1001/jama.2017.20141
5. Mintz LJ, Stoller JK. A systematic review of physician leadership and emotional intelligence. *J Grad Med Educ.* 2014;6(1):21–31. doi:10.4300/JGME-D-13-00012.1
6. Leonard M, Graham S, Bonacum D. The human factor: the critical importance of effective teamwork and communication in providing safe care. *Qual Saf Health Care.* 2004;13(Suppl 1):i85–i90. doi:10.1136/qhc.13.suppl\_1.i85
7. Salovey P, Mayer JD. What is emotional intelligence? In: *Emotional Development and Emotional Intelligence.* Harper Collins; 1997:3–34.
8. Goleman D. *Working with Emotional Intelligence.* Bantam Books; 1998.
9. Bar-On R. The bar-on model of emotional-social intelligence. *Psicothema.* 2006;18 Suppl:13–25.
10. Bradberry T, Greaves J. *Emotional Intelligence 2.0.* TalentSmart; 2009.
11. Bar-On R. *Emotional Quotient Inventory 2.0 User's Handbook.* Multi-Health Systems; 2004.
12. Matthews G, Zeidner M, Roberts R. *Emotional Intelligence.* MIT Press; 2004.
13. Shahid R, Adams W. Educational intervention improves pediatric and med-peds residents' emotional intelligence scores & stress management/resilience scores [abstract]. *Acad Pediatr.* 2017;17:e40. doi:10.1016/j.acap.2017.04.119
14. Wasfie T, Kirkpatrick H, Barber K, Hella J, Lange M, Vogel M. Burnout and well-being of medical and surgical residents in relation to emotional intelligence: a 3-year study. *Surgery.* 2023;18:S0039–6060(23)00602–5. doi:10.1016/j.surg.2023.08.035
15. Wasfie T, Kirkpatrick H, Barber K, Hella JR, Anderson T, Vogel M. Longitudinal study of emotional intelligence, well-being, and burnout of surgical and medical residents. *Am Surg.* 2023;89(7):3077–3083. doi:10.1177/00031348231157813
16. Winkel AF, Tristan SB, Dow M, et al. A national curriculum to address professional fulfillment and burnout in OB-GYN residents. *J Grad Med Educ.* 2020;12(4):461–468. doi:10.4300/JGME-D-19-00728.1
17. Dugan JW, Weatherly RA, Girod DA, Barber CE, Tsue TT. A longitudinal study of emotional intelligence training for otolaryngology residents and faculty. *JAMA Otolaryngol Head Neck Surg.* 2014;140(8):720. doi:10.1001/jamaoto.2014.1169



18. Shahid R, Stirling J, Adams W. Promoting wellness and stress management in residents through emotional intelligence training. *Adv Med Educ Pract.* 2018;9:681–686. doi:10.2147/AMEP.S175299
19. Hollis RH, Theiss LM, Gullick AA, et al. Emotional intelligence in surgery is associated with resident job satisfaction. *J Surg Res.* 2017;209:178–183. doi:10.1016/j.jss.2016.10.015
20. Lin DT, Liebert CA, Tran J, Lau JN, Salles A. Emotional Intelligence as a Predictor of Resident Well-Being. *J Am Coll Surg.* 2016;223(2):352–358. doi:10.1016/J.JAMCOLLSURG.2016.04.044
21. Blanchard C, Kravets V, Schenker M, Moore T. Emotional intelligence, burnout, and professional fulfillment in clinical year medical students. *Med Teach.* 2021;43(9):1063–1069. doi:10.1080/0142159X.2021.1915468
22. Epstein RM, Krasner MS. Physician resilience: what it means, why it matters, and how to promote it. *Acad Med.* 2013;88(3):301–303. doi:10.1097/ACM.0b013e318280cff0
23. Weng HC, Hung CM, Liu YT, et al. Associations between emotional intelligence and doctor burnout, job satisfaction and patient satisfaction. *Med Educ.* 2011;45(8):835–842. doi:10.1111/J.1365-2923.2011.03985.X
24. Arora S, Ashrafian H, Davis R, Athanasios T, Darzi A, Sevdalis N. Emotional intelligence in medicine: a systematic review through the context of the ACGME competencies. *Med Educ.* 2010;44(8):749–764. doi:10.1111/j.1365-2923.2010.03709.x
25. Kirch DG, Gusic ME, Ast C. Undergraduate medical education and the foundation of physician professionalism. *JAMA.* 2015;313(18):1797–1798. doi:10.1001/JAMA.2015.4019
26. Versel JL, Plezia A, Jennings L, Sontag-Milobsky I, Adams W, Shahid R. Emotional intelligence and resilience “PROGRAM” improves wellbeing and stress management skills in preclinical medical students. *Adv Med Educ Pract.* 2023;14:1309–1316. doi:10.2147/AMEP.S437053
27. Satterfield JM, Hughes E. Emotion skills training for medical students: a systematic review. *Med Educ.* 2007;41(10):935–941. doi:10.1111/j.1365-2923.2007.02835.x
28. Toriello HV, Van de Ridder JMM, Brewer P, et al. Emotional intelligence in undergraduate medical students: a scoping review. *Adv Health Sci Educ.* 2022;27(1):167–187. doi:10.1007/s10459-021-10079-2
29. Borges NJ, Thompson BM, Roman BJ, et al. Team emotional intelligence, team interactions, and gender in medical students during a psychiatry clerkship. *Acad Psychiatry.* 2015;39(6):661–663. doi:10.1007/s40596-015-0282-4
30. Bird AN, Martinchek M, Pincavage AT. A curriculum to enhance resilience in internal medicine interns. *J Grad Med Educ.* 2017;9(5):600–604. doi:10.4300/JGME-D-16-00554.1
31. Raut A, Gupta S. Reflection and peer feedback for augmenting emotional intelligence among undergraduate students: a quasi-experimental study from a rural medical college in central India. *Educ Health.* 2019;32(1):3. doi:10.4103/efh.Efh\_31\_17
32. Guseh SH, Chen XP, Johnson NR. Can enriching emotional intelligence improve medical students’ proactivity and adaptability during OB/GYN clerkships? *Int J Med Educ.* 2015;6:208–212. doi:10.5116/IJME.5658.0A6B
33. Lolaty HA, Ghahari S, Targari A, Fard JH. The effect of life skills training on emotional intelligence of the medical sciences students in Iran. *Indian J Psychol Med.* 2012;34(4):350–354. doi:10.4103/0253-7176.108217
34. Cheung EO, Kwok I, Ludwig AB, et al. Development of a positive psychology program (LAVENDER) for preserving medical student well-being: a single-arm pilot study. *Glob Adv Health Med.* 2021;10:216495612098848. doi:10.1177/2164956120988481
35. Fletcher I, Leadbetter P, Curran A, O’Sullivan H. A pilot study assessing emotional intelligence training and communication skills with 3rd year medical students. *Patient Educ Couns.* 2009;76(3):376–379. doi:10.1016/j.pec.2009.07.019
36. Tucker T, Bouvette M, Daly S, Grassau P. Finding the sweet spot: developing, implementing and evaluating a burn out and compassion fatigue intervention for third year medical trainees. *Eval Program Plann.* 2017;65:106–112. doi:10.1016/J.EVALPROGPLAN.2017.07.006
37. Houpy JC, Lee WW, Woodruff JN, Pincavage AT. Medical student resilience and stressful clinical events during clinical training. *Med Educ Online.* 2017;22(1):1320187. doi:10.1080/10872981.2017.1320187
38. Doherty EM, Cronin PA, Offiah G. Emotional intelligence assessment in a graduate entry medical school curriculum. *BMC Med Educ.* 2013;13(1):38. doi:10.1186/1472-6920-13-38
39. Kahkoska AR, DeSelm TM, Young LA. Assessment of third-year medical students’ comfort and preparedness for navigating challenging clinical scenarios with patients, peers, and supervisors. *BMC Med Educ.* 2020;20:71. doi:10.1186/s12909-020-1984-1
40. Hill MR, Goicochea S, Merlo LJ. In their own words: stressors facing medical students in the millennial generation. *Med Educ Online.* 2018;23(1):1530558. doi:10.1080/10872981.2018.1530558

## Advances in Medical Education and Practice

Dovepress

### Publish your work in this journal

Advances in Medical Education and Practice is an international, peer-reviewed, open access journal that aims to present and publish research on Medical Education covering medical, dental, nursing and allied health care professional education. The journal covers undergraduate education, postgraduate training and continuing medical education including emerging trends and innovative models linking education, research, and health care services. The manuscript management system is completely online and includes a very quick and fair peer-review system. Visit <http://www.dovepress.com/testimonials.php> to read real quotes from published authors.

Submit your manuscript here: <http://www.dovepress.com/advances-in-medical-education-and-practice-journal>