

Original Research



# Mindfulness-based resilience training on the psychological well-being of medical students during the COVID-19 pandemic

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## Abstract

**Background:** In recent years, research has witnessed an exciting change toward well-being and health instead of emphasizing disorders and inefficiency. The current study aimed to assess the effect of a mindfulness-based resilience training program on the psychological well-being of medical students during the COVID-19 pandemic.

**Methods:** The current study was quasi-experimental with a control group and a pre/post design. A sample of 30 students was randomly selected from a community of medical students at the Tabriz University of Medical Sciences in the academic year 2021-2022. These students were randomly divided into two groups of 15 participants. The tools used in this research included Ryff's Psychological Well-Being Questionnaire (PWB-18) and an integrated training program for resilience and mindfulness.

**Results:** The findings showed an integrated training program of resilience and mindfulness positively affected students' psychological well-being. In addition, this intervention was able to explain 59% of the combined variance of psychological well-being variables.

**Conclusion:** The results of the current study found that an integrated training program of resilience and mindfulness can improve individuals' psychological well-being during a difficult situation such as the COVID-19 pandemic.

## Introduction

The COVID-19 pandemic caused widespread problems worldwide. The virus spread rapidly and globally in a very short time which caused extensive terror and resulted in enforced restrictions by public health authorities in many countries.<sup>1,2</sup> In addition, the pandemic affected life satisfaction, quality of life, life expectancy, and psychological well-being of community members especially young adults, considering certain conditions of their age.<sup>3</sup>

Theoretical literature defines psychological well-being as life satisfaction, experiencing positive affect, and lack of negative affect.<sup>4</sup> There is a growing awareness among researchers that well-being is not only an absence of emotional distress but also implies a positive physical, mental, and social condition.<sup>5</sup> Longitudinal research has shown that individuals with higher psychological well-being have greater mental health and report lower levels of chronic conditions, symptoms, and functional impairment than individuals with lower levels of well-being.<sup>6</sup> Evidence also shows that psychological well-being plays a protective role against some diseases and

disabilities through the optimal regulation of various physiological and nervous systems.<sup>7</sup> However, our current understanding of how the outbreak of a disease affects psychological well-being is incomplete.<sup>2</sup> Therefore, it is necessary to understand the underlying mechanisms related to psychological well-being and then develop targeted and effective educational programs to promote well-being.<sup>8</sup>

Resilience is one of the effective mechanisms of psychological well-being<sup>9</sup> and is positively related to the well-being of medical students.<sup>10</sup> Resilience is defined as the ability to recover from difficulties or how one copes in the face of adversity.<sup>11</sup> Extensive research shows a relationship between the resilience of medical students and lower levels of mental distress,<sup>12</sup> depression symptoms, and anxiety<sup>8</sup> and higher levels of life satisfaction, happiness, quality of life, and subjective well-being.<sup>13,14</sup> However, the perceived stress of medical students is higher and their coping skills, resilience, and psychological well-being are lower than the general public.<sup>10,15</sup>

Among the factors thought to contribute to resilience, mindfulness has received increasing attention in recent

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years.<sup>16,17</sup> Mindfulness is considered to be an intentional capacity and state of awareness which relates to the process of paying attention to the present moment in a non-judgmental and accepting manner.<sup>18</sup> This capacity may help individuals be aware of their own and others' feelings and available resources when encountering difficult situations.<sup>19</sup> It is argued that the tendency to pay attention to unpleasant stimuli and events may encourage both the development and reintegration of adaptation, elements that are considered essential for resilience.<sup>20</sup> It seems that contemporary research supports this claim with positive correlations between mindfulness and resilience,<sup>21</sup> mindfulness and distress tolerance,<sup>22</sup> and emotion regulation skills<sup>23</sup> and psychological flexibility.<sup>24</sup> Accordingly, various psychotherapy interventions include the important component of mindfulness and are effective in treating a wide range of psychological conditions and issues.<sup>25</sup>

Despite growing evidence supporting the connection and effect of resilience and mindfulness on psychological well-being, the nature of the relationship between these multidimensional structures remains equivocal.<sup>25,26</sup> An understanding is necessary to promote psychological well-being, understand the underlying mechanisms related to this construct, and then develop targeted and effective educational programs.<sup>14</sup> On the other hand, although meta-analyses have found strong relationships between resilience criteria and well-being criteria,<sup>27</sup> the direction and composition of the relationship between resilience and well-being are not simple; these constructs have a dynamic nature in addition to their multidimensional structure.<sup>26,28</sup> Additionally, some antecedents of well-being and resilience may reduce the attainment of the other. It is suggested that future studies investigate and discover these potential differences.

Considering the aforementioned contradictions and shortcomings, the increase in distress and worry during the COVID-19 pandemic, the lack of evidence-based research related to the combined effects of resilience and mindfulness on the psychological well-being of medical students during the COVID-19 pandemic, and the challenging relationship between resilience and well-being<sup>29</sup> all highlight the significance of the current study. Thus, the current study investigated the effect of an integrated training program of resilience and mindfulness on the psychological well-being of medical students during the COVID-19 pandemic.

## Materials and Methods

The current study was quasi-experimental with a control group and a pre/post design. First, a research permit was obtained from the Tabriz University of Medical Sciences under reference number 1802/2475/122. To conduct the research, one class was selected from the population of medical students at the Tabriz University of Medical Sciences using a single-stage cluster random sampling

method for the academic year 2021-2022. Then, based on existing similar research, a sample of 30 students (externs) was randomly selected; they were then randomly divided into two groups of 15 participants. The sample size was calculated considering the average score of psychological well-being in the experimental and control groups as 15 individuals for each group and a total of 30 individuals, estimated at 67.6 and 69.2, respectively, with a study power of 89%.<sup>30</sup>

### Inclusion and exclusion criteria

The criteria for entering the study were informed consent, absence of psychological problems (obtained by the researchers in the form of a survey and self-report), and not using concurrent interventions; and the exclusion criteria were not being in the selected class, not agreeing to participate, or not participating in all training sessions.

### Data collection

Pre-test scores were obtained from both groups using standard instruments of psychological well-being. Ten sessions of an integrated training program of resilience and mindfulness were conducted for 90 minutes per session for one month for the experimental group; the control group did not receive training. After completing the training, post-test scores were obtained using the same standard scales. Responses were coded and the identity of the respondents was unknown; however, due to the coronavirus situation, the closure of the university, and the researchers' lack of access to the study groups, the follow-up phase was omitted.

This study used the following instruments:

Ryff's Psychological Well-Being Questionnaire (PWB-18): This scale was designed by Ryff in 1989 and revised in 2002. It has 120 items and 6 subscales encompassing autonomy, environmental mastery, personal growth, positive relations with others, purpose in life, and self-acceptance. The scale uses a 6-point Likert scale ranging from 1 (strongly disagree) to 6 (strongly agree). A higher score indicates a high level of psychological well-being. In subsequent research, shorter versions of 84, 54, and 18 items were also presented. For this study, the 18-item short form of this scale was used. Ryff and Keyes reported that the subscale correlation of the 18-item version with the 120-item version was between 70% and 89%.<sup>31</sup> Internal consistency using Cronbach's alpha for the six factors of autonomy, environmental mastery, positive relations with others, purpose in life, personal growth, and self-acceptance were 0.72, 0.76, 0.75, 0.52, 0.73, and 0.51, respectively, and for the whole scale was 0.71.<sup>32</sup>

Cronbach's alpha over 0.70 is considered acceptable for social sciences research.

The integrated training program of resilience and mindfulness: This training program includes mindfulness training, psychological education, and a range of skills and strategies derived from evidence-based therapies,

including acceptance and commitment therapy (ACT), mindfulness-based stress reduction, and compassion-focused therapy. This training program teaches basic cognitive strategies that may increase the learner’s ability to manage stress and cope with unfavorable situations.<sup>26</sup> This program includes ten 90-minute sessions taught for one month. Table 1 shows a summary of the training program.

**Analysis method**

Data were analyzed using SPSS 20. Descriptive statistics were used to examine the central tendencies and multivariate analysis of covariance (MANCOVA) was used for the research hypothesis and effectiveness of the program.

**Results**

The study participants were medical (extern) students with an average age of 23.6 and in the age range of 21 to 24 years. In the current study, the descriptive indicators of the dependent variable of psychological well-being are shown in Table 2.

The results obtained from the descriptive data in Table 2 showed that the average post-test scores of the experimental group for the components of autonomy, environmental mastery, purpose in life, and self-acceptance were significantly higher than the control group; but no significant increase was seen in the components of personal growth or positive relations with others.

MANCOVA was used to investigate the effectiveness

**Table 1.** Summary of the designed resilience training program

Session	Goal	Content and activity
One	Introducing the program and acquainting the members with each other	Brief explanations of the schedule and time of the meetings, stating the rules and regulations of the training course, motivating, and conducting the pre-test.
Two	Stating the concept of resilience and mindfulness	Defining resilience and its components - Defining mindfulness and its components - Being in the present moment and paying attention to the here and now.
Three	Getting to know internal support factors and mindfulness skills	Paying attention to the self and recognizing talents and interests - Identifying factors affecting the improvement of abilities and the development of awareness - Recognizing unhelpful mental chatter.
Four	Understanding the relationship between behavior, emotion, and cognition	Cognitive reconstruction and creation of a constructive thinking pattern (stating the role of beliefs and thoughts in behavior and emotions and getting to know cognitive errors) - Conscious body scanning.
Five	Recognizing avoidance strategies and adaptive strategies	Investigating the characteristics of the avoidant and adaptive mind and its outcomes - Focusing solely on the subject of interest and intentionally deviating from it (reducing the power of the mind's commands).
Six	Taking responsibility	Identifying and accepting individual differences - Accepting the role of and responsibility for one's own decisions.
Seven	Goal setting, self-care, and self-support	Goal setting and discovering the positive meaning of life, hope, and its role in self-support - Necessary measures for flexibility and compassion - Identifying barriers to achieving flexibility and compassion.
Eight	Compassion-focused mindfulness	Practice gratitude, optimism, and resilience recognize and celebrate turning points. Make a personal action plan to practice the skills.
Nine	Accepting one's wholeness and giving meaning to unvarying problems	Accepting old wounds and shortcomings and finding the meaning of life - Write letters to yourself, express your strengths and weaknesses, and be grateful for being unique.
Ten	Summing up and Conclusion	Reviewing the sessions and discussing them - Doing some exercises - Question and answer, and conducting the post-test.

**Table 2.** Descriptive indicators of the dependent variable in the experimental group (n=15) and the control group (n=15)

Variable	Components	Group	n	Pre-test				Post-test			
				Mean	SD	Min	Max	Mean	SD	Min	Max
Psychological well-being	Autonomy	Experimental	15	11.4	1.9	8	14	13.1	1.75	10	16
		Control	15	10.8	1.97	8	14	10.73	1.9	8	15
	Environmental mastery	Experimental	15	11.9	2.15	8	15	12.4	2.02	10	16
		Control	15	11.33	1.76	7	14	11.1	1.3	8	13
	Personal growth	Experimental	15	11	2.25	7	14	10.86	2.3	7	15
		Control	15	10.93	1.98	7	13	10.5	1.8	7	14
	Positive relations with others	Experimental	15	11.4	2	9	15	11	2.36	8	15
		Control	15	10.7	2.12	8	15	11.2	1.92	9	15
	Purpose in life	Experimental	15	11.8	1.86	10	16	12.87	1.77	10	15
		Control	15	12	2.03	8	16	11.89	2.14	8	15
	Self-acceptance	Experimental	15	10.87	1.92	8	14	11.94	2.6	8	16
		Control	15	10.93	2.01	8	14	10.8	2.07	8	15

of the integrated resilience and mindfulness training program on academic well-being. Before using this method of analysis, its assumptions were examined. The assumption of normality of the distribution of the dependent variable was checked using the Kolmogorov-Smirnoff test, and the calculated  $z$  values for all components were not significant at the  $P < 0.01$  level. The result of the assumption of the homogeneity of error variance for the dependent variables was confirmed using Levene's test, examining the assumption of canonical correlation of dependent variables using Bartlett's test of sphericity, showed that the calculated  $\chi^2$  value (24.09) was significant at the  $\alpha < 0.05$  level. Considering that the general and specific assumptions of MANCOVA were met, this method was used to analyze the data related to the main research hypothesis.

Table 3 shows that the calculated  $F$  (4.11) was significant at the  $P < 0.05$  level. Therefore, our general assumption about the difference between the groups for the investigated variables was confirmed. That is, there was a significant difference between the two groups of students, control and experimental, at least in one of the dependent variables of psychological well-being. Moreover, considering the calculated Eta coefficient ( $\eta^2 = 0.59$ ), it can be concluded that the method of integrated training of resilience and mindfulness, despite the differences in the groups, can explain 59% of the combined variance of

psychological well-being variables with a power of 90%.

According to Table 4, the integrated training program of resilience and awareness was significantly effective for autonomy, environmental mastery, purpose in life, and self-acceptance components of psychological well-being. As the calculated  $F$  for the components of autonomy ( $F = 15.22$ ,  $\eta^2 = 0.41$ ), environmental mastery ( $F = 7.48$ ,  $\eta^2 = 0.25$ ), purpose in life ( $F = 5.22$ ,  $\eta^2 = 0.18$ ), and self-acceptance ( $F = 6.002$ ,  $\eta^2 = 0.21$ ) were significant at  $P < 0.05$ , it can be stated that the integrated training program of resilience and mindfulness can explain the autonomy component by 41%, environmental mastery by 25%, purpose in life by 18%, and self-acceptance by 21%. However, there were no significant effects on the psychological well-being components of positive relations with others and personal growth.

### Discussion

The current study aimed to investigate the effectiveness of an integrated training program of resilience and mindfulness on the improvement of psychological well-being components in medical students. The results showed that the integrated training program of resilience and mindfulness had significantly positive effects on the components of autonomy, environmental mastery, purpose in life, and self-acceptance; and there were no significant effects on the components of personal growth

**Table 3.** The results of MANCOVA

Source	Test	Value	F	DF	Error DF	Level of significance	Eta coefficient	Power
Method	Wilks' lambda	0.41	4.11	6	17	0.01	0.59	0.9

**Table 4.** Covariance analysis of the effects of an integrated mindfulness and resilience program on psychological well-being components with pre-test control

Variable	Source	Sum of squares	DF	Mean square	F	Level of significance	Eta coefficient	Power
Autonomy	Method	17.37	1	17.37	15.22	0.001	0.41	0.96
	Error	25.1	22	1.14				
	Total	4383	30					
Environmental mastery	Method	9.93	1	9.93	7.48	0.01	0.25	0.74
	Error	29.2	22	1.33				
	Total	4010	30					
Personal growth	Method	0.922	1	0.922	0.95	0.34	0.04	0.16
	Error	21.32	22	0.97				
	Total	3389	30					
Positive relations with others	Method	0.311	1	0.311	0.06	0.8	0.003	0.06
	Error	108.63	22	4.94				
	Total	3940	30					
Purpose in life	Method	11.28	1	11.28	5.52	0.02	0.18	0.62
	Error	53.11	22	2.04				
	Total	3933	30					
Self-acceptance	Method	21.84	1	21.84	6.002	0.02	0.21	0.65
	Error	80.6	22	3.64				
	Total	4041	30					

and positive relations with others. These findings are consistent with research<sup>24,26,33,34</sup> which studied integrated relationships of resilience and mindfulness on well-being and confirmed the effectiveness of the training program.

In explaining these findings, in line with researchers who described resilience as a dynamic and changeable structure, it can be stated that the resilience of medical students is changeable and responds to the processes of educational and cognitive development. This may indicate that participating in an integrated training program of resilience and mindfulness leads to an increase in the level of mindfulness.<sup>35</sup> According to resilience research, increased mindfulness may provide positive growth and cognitive and emotional development processes needed to recharge resilience factors and improve psychological well-being.<sup>24</sup> These results indicate that mindfulness draws attention to the emotional response caused by a stressful event. This awareness promotes adaptation to a stressful event by engaging in cognitive emotion regulation strategies (adaptive) to alter the negative emotional response. Adaptive emotion regulation strategies reinterpret the meaning of a stressful event in a positive way, which leads to coping strategies and the flourishing of abilities in stressful events, thus resulting in resilience. On the other hand, being less mindful leads to engaging in maladaptive strategies that inhibit the ability to adapt to a stressful event, and automatically reacting to a stressful event leads to less effort to change a negative emotional response. Additionally, failure to use mindfulness allows the mind to wander and focus on the stressor, which exacerbates the negative emotional response and thus inhibits resilience.<sup>36</sup>

Based on this discussion, when medical students participate in an integrated training program of resilience and mindfulness, their cognitive ability and flexibility will be developed. It will help them to become aware of negative feelings and thoughts, use effective coping styles, and, by recognizing their role and feeling more competent in the face of uncontrollable external factors such as the coronavirus epidemic, improve their personal and internal skills (such as cognitive restructuring, developing patterns of constructive thinking, being hopeful, and setting goals) and change their behavior based on their abilities and talents<sup>37</sup>; thus they can improve their efficiency by cultivating a mindset focused on developing behaviors needed to maximize success.<sup>38</sup> It seems that improvements and development of skills to cultivate mindfulness and improve resilience may accumulate over time, and will thus be beneficial to protect medical students from psychological burnout and result in improved psychological well-being.<sup>23</sup>

Several limitations should be considered when examining the results of this study. First, the use of a small sample size limits the generalizability of the findings. It is

suggested that future studies be conducted with a larger sample and more diverse educational and socio-economic backgrounds. Second, according to the findings that mindfulness and resilience skills may develop over time, an additional longitudinal measurement may also help researchers further investigate this phenomenon.

### Conclusion

The results of the study showed that an integrated training program of resilience and mindfulness had a significantly positive effect on the improvement of psychological well-being components in medical students. Therefore, in stressful situations, it is crucial to pay attention to the training of psychological protective factors of resilience and mindfulness to increase the ability to adapt successfully to threatening and adverse conditions in both students and the general public.

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### Authors' Contribution

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### Competing Interests

The authors declare no competing interests.

### Ethical Approval

The current study has the ethics code of IR.IAU.TABRIZ.REC.1400.193 from Research Development and Evaluation Administration of the Tabriz University of Medical Sciences. Before conducting the intervention, written consent was obtained from the participants according to the ethical standards, including the strict observance of the principle of respect and confidentiality, the prevention of the disclosure of the obtained information of the subjects and their real names, and the principle of the participant's freedom and discretion to participate in or leave the study.

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