STRESS REDUCTION INTERVENTION FOR PREVENTIVE MEDICINE STUDENTS IN VIETNAM’S LIMITED RESOURCES SETTING

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ABSTRACT

Introduction. Implementing stress reduction approaches for high-risk students may reduce the negative effects on academic performance, social relationships, and health. Most existing research on intervention showed the effectiveness of mindfulness-based stress reduction (MBSR) with strict study designs but has not examined the impact in a real-life setting.  
The objective of the study was to identify the factors associated with stress level and the effectiveness of intervention using MBSR.  
Material and methods. A mixed-methods study consisting of a cross-sectional study in 362 students (Phase I) and intervention in 115 students with moderate and severe stress levels (Phase II) using the 108-item version of the Perceived Stress Scale (PSS-108) and the 8-item version of the Mindfulness Attention Awareness Scale (MAAS-8) for evaluating stress level and mindfulness.  
Results. The mean stress level and mindfulness scores were significantly lower in the intervention group compared to the control group. The percentage of students with severe stress levels was significantly lower in the intervention group than in the control group.  
Conclusion. The intervention using MBSR was effective in reducing stress levels and improving mindfulness in students with moderate and severe stress levels.

RéSUMÉ

Introduction. La mise en place d’approches de réduction du stress pour les étudiants à haut risque peut réduire les effets négatifs sur les performances académiques, les relations sociales et la santé. La plupart des recherches existantes sur les interventions ont montré l’efficacité de la réduction du stress basée sur la pleine conscience (MBSR) avec des conceptions d’étude strictes, mais n’ont pas examiné l’impact dans un environnement réel.

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INTRODUCTION

Stress is defined as the physiological and psychological reaction to stressors. These factors contribute to alterations in human behaviors, perception, and physiological reactions before, during, and after exposure to the stressor. Chronic stress is a recognized risk factor for various disorders including hypertension and diabetes, with severity depending on the nature and duration of the stress. In contrast, eustress, or short-term stress, may bring about physiological benefits by boosting the immune system. In previous studies, stress was classified by timescale to fall into one of the following types: chronic stress, life event stress, stress resulting from traumatic life events, stress resulting from daily hassles, and acute stress. Accordingly, current psychological stress self-report questionnaires in adult populations measure major life event, catastrophic experiences, early life stress exposure, and ongoing chronic or perceived stress.

Keywords: stress, mindfulness-based stress reduction, student.

List of abbreviations

MBSR – Mindfulness-based stress reduction
PSS-10 – Perceived stress scale
CI – Confidence Interval
SOS – Stress Overload Scale
SIC – Stress in context questionnaire
DASS – Depression anxiety stress scale
OR – Odd ratio
SD – Standard deviation

L’objectif de l’étude était à identifier les facteurs associés au niveau de stress et à l’efficacité de l’intervention à l’aide de la MBSR.

Matériel et méthodes. Une étude mixte composée d’une étude transversale chez 362 étudiants (Phase 1) et d’une intervention chez 115 étudiants ayant des niveaux de stress modérés et sévères (Phase 2). L’échelle de stress perçue à 10 éléments (PSS-10) a été utilisée pour évaluer les niveaux de stress des participants et évaluer le résultat de l’intervention.

Résultats. La MBSR en ligne a efficacement réduit le stress chez les étudiants ayant des niveaux de stress modérés et sévères après deux mois d’intervention. La MBSR était associée à une réduction statistiquement significative du stress, avec 63,48% des cas montrant des niveaux de stress réduits, et une réduction de groupe de score de stress de 5,97 avec un intervalle de confiance à 95% (IC): 4,96 à 6,96, (p=0,008). Le modèle de régression logistique a montré que le fait d’être une femme, de ne pas être d’accord avec ses parents, d’avoir un proche atteint d’une maladie grave, de mettre fin à une relation et des problèmes financiers étaient des facteurs associés au stress modéré et sévère.

Conclusions. La mise en œuvre de la MBSR était associée à une amélioration de l’état de stress avec une réduction significative des scores de stress chez les étudiants. Ces résultats fournissent des preuves que des recherches futures sont nécessaires pour concevoir des stratégies adaptées à la gestion du stress dans les environnements académiques.

Mots-clés: stress, réduction du stress basée sur la pleine conscience, étudiant.

Results. The online MBSR effectively reduced stress in students with moderate and severe stress levels after two months of intervention. MBSR was associated with a statistically significant reduction in stress, with 63.48% of cases showing reduced stress levels, and a group reduction in stress score of 5.97 with a 95% confidence interval (CI): 4.96 to 6.96, (p=0.008). The logistic regression model showed that being a woman, disagreeing with parents, having a loved one with a severe illness, ending a relationship, and financial trouble were factors associated with moderate and severe stress.

Conclusions. Delivering MBSR was associated with an improvement in stress status with a significant reduction in stress scores among students. These findings provide evidence that future research is necessary to design tailored strategies for coping with stress in academic environments.

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Results. The online MBSR effectively reduced stress in students with moderate and severe stress levels after two months of intervention. MBSR was associated with a statistically significant reduction in stress, with 63.48% of cases showing reduced stress levels, and a group reduction in stress score of 5.97 with a 95% confidence interval (CI): 4.96 to 6.96, (p=0.008). The logistic regression model showed that being a woman, disagreeing with parents, having a loved one with a severe illness, ending a relationship, and financial trouble were factors associated with moderate and severe stress.

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the selected stress assessment tools and the discipline of the students studied. In student populations in Vietnam, there is much evidence of academic pressure being associated with mental health problems, including anxiety and depression, with prevalence rates of 22.8% and 41.1%, respectively. Health science students are typically considered to have a heavier academic workload than students in other disciplines with a 6-year program. In Vietnam, preventive medicine is a field of study that educates future preventive medicine practitioners with the knowledge and skills required to engage in public health-related activities and to practice at a level of clinical competence adequate for primary care. These students have a course program like that of general medicine students; therefore, it is the responsibility of the university to manage student stress levels with appropriate interventions.

Previous studies have assessed the factors associated with stress among students. The most identified risk factors included financial concerns, interpersonal conflicts with parents, siblings, and professors, and academic pressures. Conversely, mindfulness and positivity were identified as protective qualities. Depending on an individual’s characteristics and the method by which they are exposed to stressors, stressors can induce different levels of stress. Stressors can be classified based on their acute or chronic nature, cumulative consequences, and life-altering outcomes. The traits of the individual also significantly affect the stress response. Variations in factors between stressor-exposed people, such as gender and stress resistance ability, are widely acknowledged. Students must thus be supported in accessing a stress reduction program that is both easily and readily available. In academic settings in Southeast Asian countries, there are now a variety of obstacles preventing access to the provision of mental health services. A feasible intervention for stress is greatly needed for at-risk groups of students.

Typically, methods of coping with stress are divided into those that are problem-focused and emotion-focused. Problem-focused methods comprise several components, including planning, restricting other activities, awaiting proper action, finding instruments, and obtaining social support. Meanwhile, emotion-focused methods include social-emotional support, understanding situations constructively, embracing, rejecting, or turning to religion. Both strategies have been reportedly used with varying levels of positive impact. However, emotion-focused strategies seem to be better documented in research compared to problem-focused strategies. Mindfulness-based stress reduction (MBSR), an eight-week intervention program, using emotion-focused methods, which is in part similar to cognitive behavioral therapy in terms of reducing stress by promoting a healthier thinking pattern. Many studies have shown MBSR to be beneficial for reducing everyday stress and chronic stress, and improving health in a variety of patient populations and health care providers in non-clinical settings, and also in student populations. Additionally, previous studies have shown the positive physical health effects of MBSR. However, much of the existing intervention research has demonstrated the effectiveness of the MBSR with strict study designs but has not examined the impact in a real-life setting.

The objectives of this study were (1) to identify the key stress-related factors and (2) to assess the effectiveness of introducing MBSR into the current university setting in reducing the stress levels of students.

Materials and methods

Study design

A study utilizing a cross-sectional mixed-methods design was conducted to assess the stress levels of 362 students. This was followed by a quasi-experimental study in 115 students with moderate and high stress levels to investigate the efficacy of a stress reduction intervention.

Study design and population

In September 2017, at the beginning of a new semester, 362 second- to fifth-year preventive medicine students at Can Tho University of Medicine and Pharmacy (Vietnam) were invited to participate in this cross-sectional study. Freshmen and seniors were not included in the study due to their academic and lifestyle disparities with the bulk of the student research population; first-year students having only just begun their course, and final-year students being occupied with working on their final theses and undertaking medical internships. These factors might have a significant effect on the stress characteristics and MBSR intervention, therefore freshmen and seniors were then omitted from the study.

A purposively selected sampling method was applied based on the current student list provided by the Undergraduates Training and Educational Office of the University. All 362 students were instructed to complete a self-report questionnaire in class and seal it in an envelope to maintain anonymity. Finally, all 362 completed responses were included in the analysis identifying students with moderate and severe stress levels for the subsequent quasi-experimental study.
In October and November 2017, 115 eligible students were invited to attend an intervention MBSR program for eight weeks. This program consisted of primary exercises and minor exercises. The primary exercises comprised: (1) body awareness: practice shifting the focus of attention to different body areas and the sensations, feelings, or thoughts that arise during the moment; (2) meditation: practice focusing on the present by paying attention to each inhalation and exhalation; and (3) some simple yoga gestures. Students were also encouraged to practice the minor MBSR exercises at home including (a) awareness of current activity; (b) recording their feelings and sensations during a pleasant situation; (c) recording their feelings and sensations during an unpleasant situation; (d) awareness of breathing for one minute; (e) practicing recording their feelings and sensations in pain; (f) practicing recording their feelings and sensations during a communication they had had during the day. All intervention content was based on an MBSR website developed by Jon Kabat-Zinn, the current executive director of the MBSR program at the University of Massachusetts School of Medicine, United States, which demonstrated the stress-reduction benefits of the technique. MBSR printed materials, as well as related video and audio materials were translated into Vietnamese with support from the English lecturers at the university’s faculty of public health. The trainers responsible for guiding the students at weekly meetings were lecturers of the Medical Psychology course. For the 8 weeks, students were divided into 4 class-based groups with each group comprising between 25 and 30 students. These groups were invited to weekly meetings which were scheduled flexibly to minimize the drop-out rate. One hundred percent of students participated in at least 6 sessions. At each meeting, the trainers gave instructions including explaining the MBSR concepts and related exercises so that the students could perform the primary MBSR exercises and some minor exercises together during the class. The necessary MBSR materials with detailed instructions were also delivered to each student. Students were advised to undertake one of the week’s primary activities at home for at least 15 minutes per day, at least three days per week.

Students were also asked to accurately document their time spent undertaking MBSR exercises at home to encourage them to complete sufficient practice sessions. However, this study did not assess these records as they included personal information about the emotions and thoughts of the students. At the end of the training course, in December 2017, each student’s stress status was re-evaluated using PSS-10.

Measurements

In both studies, data were collected directly during students’ scheduled classes. The questionnaire used in the cross-sectional study comprised 3 parts: (1) demographic information including age, year of study, ethnicity, accommodation type, and academic performance based on the grade-point average; (2) significant stressful life events in the last year including conflicts with parents, serious illness of a loved one, the end of a relationship, accommodation problems, financial troubles, robbery or theft; (3) stress status measured using the PSS-10. In the quasi-experimental study, only the stress status measure was used to evaluate the stress outcome.

Typically, stress is assessed using self-administered measures such as the PSS-4, PSS-10, PSS-14, and The Depression, Anxiety, and Stress Scale (DASS). The DASS-21 and DASS-42 provide additional measures of depression, anxiety, and stress which could not be fully covered in the intervention period. The study team used the PSS-10 (Cronbach’s alpha as measured in the present study = 0.81) because the number of items on the scale was suitable in proportion to the total data collected and because it provided a measurement tool for both before and after the intervention. The Vietnamese version of PSS-10 used in this research has also been demonstrated in previous studies to have acceptable validity and reliability.

The PSS, developed by Cohen et al. in 1983, originally comprised 14 items, which was then shortened to a 10-item scale with higher reliability. The PSS-10 is divided into two subscales: (1) the helplessness subscale (items 1, 2, 3, 6, 9, and 10) which assesses an individual’s perception of their lack of control over their circumstances, emotions, and reactions; (2) the self-efficacy subscale (items 4, 5, 7, and 8) which measures the individual’s perception of their ability to overcome life troubles. Each item is assessed using a Likert scale which estimates the frequency of a certain perception ranging from never to very often. Items in the helplessness subscale are scored based on the Likert scale: never = 0; almost never = 1; sometimes = 2; fairly often = 3; very often = 4. Items in the self-efficacy subscale are reversely scored: never = 4; almost never = 3; sometimes = 2; fairly often = 1; very often = 0. Therefore, the total PSS-10 score ranges from 0 to 40 points and is utilized to measure the stress level; with a higher score representing a greater stress level.

This study classifies levels of stress as follows: no stress (0-13 points), mild stress (14-19 points), moderate stress (20-26 points), and severe stress (27 or more points) to provide a suggested threshold for intervention in the university setting. In the present study,
intervention was advised for students with moderate and severe stress, i.e., a score of 20 points or more, in line with evidence that students with a stress score of less than 20 were considered to be experiencing eustress rather than harmful stress, and because this threshold was found to have good sensitivity and specificity for depression \(^{31}\).

**Data analysis**

Data were analyzed using the Statistical Package for the Social Sciences (SPSS) for Windows (version 22; IBM Corp.). The threshold for statistical significance was set at \(p = 0.05\). Frequency and percentage (%) were used to represent categorical variables such as gender, study year, academic performance, ethnicity, and accommodation type. In addition, the chi-square test was used to examine the association between perceived stress level and gender, physical activity, and significant stressful life events in the last year including conflicts with parents, serious illness of a loved one, and accommodation problems. Following the univariate analysis, factors with significant associations \((p<0.05)\) were included in a multivariate logistic regression model using odds ratios (ORs) and 95% confidence intervals (CIs) to identify factors that were significantly associated with stress levels.

Mean and standard deviation (SD) were used to summarize stress scores in both cross-sectional and quasi-experimental studies. To determine the effectiveness of the MBSR intervention on stress levels, a paired t-test was used to identify differences in stress scores after intervention in the whole sample, and in each stress level group individually.

**Results**

The characteristics of participants at baseline are presented in Table 1. Most students involved in this study were women (60.5%), of the Kinh ethnicity (90.33%), and living in rented accommodation (87.29%). The participation rate decreased steadily from the second (33.98%) to the fourth (23.48%) academic year. The proportion of students with average and lower academic performance was nearly equal to that of students with good and excellent academic performance.

**Associated factors of stress**

Using multivariate regression models, this study identified characteristics associated with severe and moderate stress levels among students such as gender, specific familial and socially related events, and other difficulties. Women were more likely to experience severe and moderate stress \((OR = 2.19; 95\% CI: 1.31 - 3.03; p = 0.003)\). Of the family factors, students who disagreed with a parent or had a loved one experience a serious illness were more likely to have a severe or moderate stress level than students who did not experience these events \((OR = 1.88; CI 95\%: 1.14 - 3.07; p=0.012 \text{ and } OR = 1.70; CI 95\%: 1.04 - 2.70; p=0.0013, \text{ respectively})\). Of the social event factors, students with romantic breakups or financial problems were more likely to be severely or moderately stressed than the others \((OR = 1.93; 95\% CI: 1.09 - 3.42; p=0.025 \text{ and } OR = 2.23; 95\% CI: 1.04-4.42; p=0.034, \text{ respectively})\). The univariate factors of academic characteristics, amount of time for physical activity, and the experience of robbery or theft were not found to be associated with stress levels \((p>0.05)\) (Table 2).

**Effectiveness of MBSR in reducing stress among students**

There was a statistically significant reduction in stress levels after the intervention \((Z = -7.95; p<0.001)\). Prior to the intervention, the rate of severe stress was 15.65%, while the rate of moderate stress was 84.35%. Following intervention, this rate declined to 36.52%, with severe stress accounting for 4.35%; the average stress rate decreased to 32.17%.

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Frequency</th>
<th>Percentage (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Gender</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Man</td>
<td>142</td>
<td>39.5</td>
</tr>
<tr>
<td>Woman</td>
<td>219</td>
<td>60.5</td>
</tr>
<tr>
<td><strong>Year of study</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Second year</td>
<td>123</td>
<td>33.98</td>
</tr>
<tr>
<td>Third year</td>
<td>92</td>
<td>25.41</td>
</tr>
<tr>
<td>Fourth year</td>
<td>85</td>
<td>23.48</td>
</tr>
<tr>
<td>Fifth year</td>
<td>62</td>
<td>17.13</td>
</tr>
<tr>
<td><strong>Academic performance</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Average and lower</td>
<td>192</td>
<td>53.04</td>
</tr>
<tr>
<td>Good</td>
<td>158</td>
<td>43.65</td>
</tr>
<tr>
<td>Excellent</td>
<td>12</td>
<td>3.31</td>
</tr>
<tr>
<td><strong>Ethnicity</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Kinh</td>
<td>327</td>
<td>90.33</td>
</tr>
<tr>
<td>Others</td>
<td>35</td>
<td>9.67</td>
</tr>
<tr>
<td><strong>Accommodation type</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Renting</td>
<td>316</td>
<td>87.29</td>
</tr>
<tr>
<td>Living with family/relatives</td>
<td>41</td>
<td>11.33</td>
</tr>
<tr>
<td>Others</td>
<td>5</td>
<td>1.38</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>362</td>
<td>100</td>
</tr>
</tbody>
</table>

Table 1. Participants characteristics at baseline \((n=362)\)
The average post-intervention reduction in stress score was 5.97 points (CI 95%: 4.96-6.96, t=-11.86, p=0.008) (Table 3). In the group of students experiencing severe stress, the mean reduction in score was 9.94 points (CI 95%: 7.32-12.57, p<0.001). In the group experiencing moderate stress, the mean reduction was 5.23 points (CI 95%: 4.20-6.26, p<0.001). With an independent t-test, the severe stress group saw a significantly greater fall of 4.71 points (CI 95%: 1.93-7.50, p=0.002) in stress score than did the moderate stress group.

**DISCUSSION**

Stress is believed to be caused by a combination of several factors. This study identified similar stress-associated factors to those reported in previous studies, such as gender, unexpected incidents in family and close relationships, and life obstacles. Other studies have found several characteristics, including school year, financial challenges, the intensity of extracurricular activities, ethnicity, and personality traits as stressors which were not found in this study. The discrepancies between studies may be explained variously. Firstly, the definition and measurement of a stressor are likely to differ across studies. Indeed, stressors related to social factors are frequently measured via self-report, which is highly dependent on the perceptions of the respondents, in that the responses may be similar, but their experiences differ. Further, stressors elicit cognitive responses that are important in the interpretation of events. These responses are likely based on innate response predispositions and prior experience. Individual differences in stress reactivity are highly influenced by genetics, early-life environment, and traumatic experiences. Secondly, the assessment of stress may differ across studies. The use of different scales, such as the PSS or DASS, and the thresholds applied to responses may have a significant impact on the stress levels of each study. Lastly, the exact impact of major life events on an individual is unpredictable.

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Frequency (%)</th>
<th>Stress status</th>
<th>Univariate analysis</th>
<th>Multivariate logistic regression</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Moderate to severe stress</td>
<td>No or mild stress</td>
<td>Crude OR (CI 95%)</td>
</tr>
<tr>
<td><strong>Gender</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Woman</td>
<td>219 (60.5)</td>
<td>106 (48.40)</td>
<td>113 (51.60)</td>
<td>2.50 (1.59-3.94)</td>
</tr>
<tr>
<td>Man</td>
<td>142 (39.5)</td>
<td>39 (27.27)</td>
<td>104 (72.73)</td>
<td></td>
</tr>
<tr>
<td><strong>Physical activity</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt; 30 min/day</td>
<td>124 (34.25)</td>
<td>59 (47.58)</td>
<td>65 (52.42)</td>
<td>1.60 (1.00-2.55)</td>
</tr>
<tr>
<td>≥ 30 min/day</td>
<td>238 (65.75)</td>
<td>86 (36.13)</td>
<td>152 (63.87)</td>
<td></td>
</tr>
<tr>
<td><strong>Conflicts with parents</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>111 (30.66)</td>
<td>61 (54.95)</td>
<td>50 (45.05)</td>
<td>2.42 (1.5-3.93)</td>
</tr>
<tr>
<td>No</td>
<td>251 (69.34)</td>
<td>84 (33.47)</td>
<td>167 (66.53)</td>
<td></td>
</tr>
<tr>
<td><strong>Serious illness of a loved one</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>121 (36.18)</td>
<td>64 (66.39)</td>
<td>57 (47.11)</td>
<td>2.22 (1.38-3.55)</td>
</tr>
<tr>
<td>No</td>
<td>231 (63.82)</td>
<td>81 (33.61)</td>
<td>160 (62.89)</td>
<td></td>
</tr>
<tr>
<td><strong>End of a romantic relationship</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>73 (20.16)</td>
<td>41 (56.16)</td>
<td>32 (43.84)</td>
<td>2.28 (1.31-3.97)</td>
</tr>
<tr>
<td>No</td>
<td>289 (79.84)</td>
<td>104 (35.99)</td>
<td>185 (64.01)</td>
<td></td>
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<tr>
<td><strong>Accommodation problems</strong></td>
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<td></td>
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<tr>
<td>Yes</td>
<td>79 (21.18)</td>
<td>44 (55.13)</td>
<td>35 (44.87)</td>
<td>2.19 (1.28-3.76)</td>
</tr>
<tr>
<td>No</td>
<td>283 (78.82)</td>
<td>101 (35.92)</td>
<td>182 (64.08)</td>
<td></td>
</tr>
<tr>
<td><strong>Financial troubles</strong></td>
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<td></td>
</tr>
<tr>
<td>Yes</td>
<td>42 (11.6)</td>
<td>26 (61.90)</td>
<td>16 (38.10)</td>
<td>2.74 (1.35-5.7)</td>
</tr>
<tr>
<td>No</td>
<td>320 (88.4)</td>
<td>119 (37.19)</td>
<td>201 (62.81)</td>
<td></td>
</tr>
<tr>
<td><strong>Experienced robbery/theft</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>33 (9.11)</td>
<td>20 (60.61)</td>
<td>13 (39.39)</td>
<td>2.51 (1.13-5.68)</td>
</tr>
<tr>
<td>No</td>
<td>229 (90.81)</td>
<td>204 (62.01)</td>
<td>125 (37.99)</td>
<td></td>
</tr>
</tbody>
</table>

*Chi-square. **Logistic regression
Indeed, the magnitude of influence of those events may depend on an individual’s personality and cultural background. Personality characteristics such as independence, social presence, and empathy have been found to be associated with stress 36. In brief, our findings corroborate previous findings regarding risk factors for student stress, such as issues involving family and loved ones, and life challenges. In addition, differences in findings between studies reinforce the assertion that cohort studies are required to identify the precise risk factors and the degree to which each of these factors contributes to stress in a particular community.

The intervention outcomes in the present study are comparable to those reported in many previous studies in terms of the significant mental health improvement measured 25,26,37–40. However, the reduction in stress score as measured by the PSS-10 scale in previous intervention studies is inconsistent 40–43. This might be explained by several elements including research design, intervention participants, and the characteristics of those delivering the intervention. For instance, to assess the stress-reduction effectiveness of MBSR, a study observing two groups of students who underwent several examinations revealed that the intervention group experienced less stress than the control group 44. The selection of intervention subjects is another variable that can affect stress reduction outcomes. A study in Vietnam that selected a stress score threshold of 26 for intervention revealed that stress reduction was around 25% in the intervention group, compared to no statistically significant change in the control group 45. Further, interventions delivered by MBSR-certificated trainers typically see outcomes with greater effect sizes 46. However, the present study suggests that the MBSR method can be implemented by the available human resources of the facility. Future research may be able to examine different implementations of the MBSR program to determine the minimum training needed to ensure a reduction in stress levels using MBSR.

This study found that students with severe stress showed better responses to the intervention (Table 3). This demonstrates that individuals with different stress levels may react differently to stress reduction interventions. Further research is needed to identify specific strategies such as emotion-focused coping or problem-solving, where effectiveness may be specific to the stress level.

A strength of the present study is the use of a screening and intervention procedure in a real-world setting. This study describes how a mental health service for college students might operate. An educational institution’s mental health intervention program should consider the type of screening, the screening instrument, the type of intervention and how to deliver it, the available human resources, and the minimum training requirements for practitioners to achieve the desired effect.

### Limitations

A limitation of this study was that, unlike controlled intervention studies, our research only had one intervention group. Due to their geographical location and lack of complete independence, it was challenging to design a randomized study with control groups at the same institution. That limitation was handled by performing the intervention in the October and November period, which lowered the potential impact of final examinations. Additionally, the length of the intervention and review was two months, with weekly intervention activities, to improve the feasibility of assessing the intervention’s effectiveness. Future stress studies are needed to define the usefulness of various stress reduction strategies, ideally using randomized control designs, while maintaining an ethical medical standard.

The intervention comprised group health education and mindfulness practice and was provided

| Table 3. Stress levels before and after intervention, and differences between time points |
|-------------------------------------|----------|----------|------------------|------|
| Prevalence of stress level (n, %)   | Before   | After    | Mean of differences (CI 95%) | p    |
| Severe stress                      | 18 (15.65)| 5 (4.35) | -                          | <0.001* |
| Moderate stress                    | 97 (84.35)| 37 (32.17) | -                          | <0.001** |
| Mild stress                        | 0        | 48 (41.74) | -                          |       |
| Free stress                        | 0        | 25 (21.74) | -                          |       |
| Mean score of stress level         | Moderate stress | 22.41±2.00 | 17.36±5.00 | 5.23 (4.20-6.26) | <0.001** |
|                   | Severe    | 30±2.52 | 20.05±4.71 | 9.94 (7.32-12.57) | <0.001** |
| Overall stress score (mean ± SD)   | 23.6±3.4 | 17.64±5.0 | 5.97 (4.96-6.96) | 0.008** |

*Chi-squared  
**Paired t-test
directly in the lecture hall. Therefore, students in the intervention group were aware of the stress levels of their classmates. This may impact the assessment of the MBSR’s effectiveness due to unexpected interactions between individuals that may impact those individuals’ stress levels in unknown ways. With limited resources, this was unavoidable. However, the present findings suggest that using group intervention using MBSR may benefit both students and the institution, particularly in low-resource settings.

Another unavoidable weakness of many intervention studies is the use of thresholds to define the intervention/stress-level groups. This may increase the likelihood of false-positive and false-negative diagnoses. As the PSS-10 is not a diagnosis tool, to minimize the impact of this limitation, the present study selected a threshold of 20 points which has been shown to provide a good correlation with depression.  

CONCLUSIONS

A variety of risk factors for preventive medicine students have been identified, including being a woman, difficulties in family and social interactions, and financial barriers. This study found that even with significant resource limitations in terms of a shortage of certified trainers and the lack of access to a private setting which is usually recommended for a mental health intervention, the delivery of an MBSR intervention in the group setting showed an improvement in stress status identified through a significant reduction in stress score. The study provides further evidence justifying the need for future research seeking tailored strategies for coping with stress in academic environments.

Author Contributions:
Conceptualization, T.T.P. and T.T.T.; methodology, T.T.P.; investigation, H.T.L, T.T.T.N.; data curation, T.T.P.; writing—original draft preparation, T.T.P, C.N.L., K.H.P., M.H.P. and C.S; writing—review and editing, K.H.P., M.H.P., N.T.T, R.S.D, V.D.T; supervision, T.T.P. All the authors have read and agreed with the final version of the article.

Compliance with Ethics Requirements:
“The authors declare no conflict of interest regarding this article”
“The authors declare that all the procedures and experiments of this study respect the ethical standards in the Helsinki Declaration of 1975, as revised in 2008(5), as well as the national law. Informed consent was obtained from all the patients included in the study”
“No funding for this study”

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