



**ARTICLE**

## Effectiveness of Mind-Body Exercise on Burnout and Stress in Female Undergraduate Students

Xiaohong Zhu<sup>1</sup>, Tongyang Chu<sup>2</sup>, Qian Yu<sup>3</sup>, Jinming Li<sup>3</sup>, Xingyu Zhang<sup>3</sup>, Yanjie Zhang<sup>3,4,\*</sup> and Liye Zou<sup>3</sup>

<sup>1</sup>College of Sports Science, Jishou University, Jishou, 416000, China

<sup>2</sup>College of Arts and Physical Education, Sejong University, Seoul, 05006, South Korea

<sup>3</sup>Exercise Psychophysiology Laboratory, Institute of KEEP Collaborative Innovation, School of Psychology, Shenzhen University, Shenzhen, 518060, China

<sup>4</sup>Health and Exercise Science Laboratory, Institute of Sports Science, Seoul National University, Seoul, 08826, South Korea

\*Corresponding Author: Yanjie Zhang. Email: elite\_zhangyj@163.com

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### ABSTRACT

This study was to investigate the effects of mind-body exercise on burnout and perceived stress among female undergraduate students. A sample of 146 female undergraduate students took part in this study. They were assigned to mind-body exercise group (n = 91) and control group (n = 55). Mind-body exercise group received three 90-min sessions of Baduanjin exercise per week lasting for 12-weeks. There was no intervention in the control group. The Maslach Burnout Inventory-Student Survey was used to assess burnout level, and the 10-item perceived stress scale was used to assess stress level. Significant decreases in emotional exhaustion ( $p < 0.001$ ), cynicism ( $p < 0.001$ ) and perceived stress ( $p < 0.001$ ) were found in the mind-body exercise group compared with control group. Furthermore after 12-week mind-body exercise, emotional exhaustion, cynicism and perceived stress had greater reduction. Mind-body exercise (Baduanjin) may be considered an alternative strategy to reduce burnout and perceived stress in female undergraduate students.

### KEYWORDS

Qigong; burnout; stress; undergraduate students

## 1 Introduction

“Burnout” is a disorder associated with the workplace, primarily proposed by Freudenberger [1]. With the development and progress of research, this concept has been gradually extended to the field of education, and is called academic burnout. Academic burnout refers to students who are disgusted with learning or lack of motivation, resulting in a state of physical and mental fatigue, and a negative attitude towards learning activities [2]. Therewith, Schaufeli et al. proposed academic burnout in school context to be conceptualized in three dimensions: emotional exhaustion, cynicism, and decreased academic efficacy, similar to work burnout [2].

Academic burnout has become a common phenomenon in students while studying at university [3,4]. Fares and colleagues found that 75% of medical undergraduate students are suffering from burnout [5]. Kristanto et al. [6] reported the prevalence of academic burnout as 66% of university students in



Malaysia. Worryingly, psychological issues (e.g., stress) and academic performance associated with burnout have been observed in students. Researchers have found that students with academic burnout present a significant increase in stress, and in turn, higher levels of stress may worsen levels of academic burnout [7,8]. Collectively, these findings indicate that burnout and stress are highly prevalent among university students are grim. It is urgent that interventions be developed to guard against student burnout and related stress problems.

Evidence suggests that engaging in physical activity is negatively associated with burnout symptoms and stress level [9,10]. Recently, a cross-sectional study showed that students who participated in at least 150-min aerobic exercise per week had a lower risk of academic burnout [11]. de Vries [12] investigated the alleviative effects of exercise on burnout of university students as well. The results revealed that 6-weeks of running contributed to reduced burnout [12]. Similarly, Pelit-Aksu et al. [13] found that progressive muscle relaxation exercise significantly reduced burnout and stress among university students compared with no-intervention group. Although these experimental studies seem to show the beneficial effects of exercise on burnout and stress problems, a recent systematic review study reports no significant effect of exercise on reducing academic burnout [14].

Mind-body exercise increased in popularity worldwide. Baduanjin, as one type of mind-body exercises, is a practicable and effective exercise modality that can be carried out without being affected by other factors (e.g., place). It is designed as a traditional Chinese medicine exercise that consists of the important element: Qi (energy) in the body. Qi circulates through multiple meridian systems within the whole body to support energy and maintain health [15]. Baduanjin exercise can enhance the Qi function through the exercise of practicing slowly body movements and rhythmic breathing with a meditation state [16]. Baduanjin practitioners can regulate their mental mood, attention and achieve positive psychological wellbeing by reducing the activity of the sympathetic nervous system [15,17]. Therefore, Baduanjin exercise has attracted the attention of researchers for treating health outcomes [15,16,18,19]. Recent review studies have documented significant benefits associated with mind-body exercise on reducing perceived stress [20], depression [15], and fatigue [21]. Thus, it is promising to apply Baduanjin exercise to promote health in university students.

However, research has not been conducted to investigate the effect of Baduanjin exercise on burnout level with respect to the academic burnout among university students. A related randomized control study indicated no significant difference between the Qigong group and no-intervention group after Qigong exercise twice a week for 12-weeks [22]. This finding could likely be attributed to insufficient exercise sessions per week to trigger positive effects in a special population. Additionally, participants with severe burnout frequently fail to attend exercise sessions. The present study aimed to investigate the effects of mind-body exercise (Baduanjin) on burnout and perceived stress among female undergraduate students.

## **2 Method**

### ***2.1 Study Design and Participants***

This study used a controlled research design including a mind-body exercise (Baduanjin) group and a control group. Baseline data was collected at the beginning of spring semester and post-intervention data was collected in three months later. Before baseline testing, detailed information about the purpose of this study was given to all participants, and an exercise program was initiated. Standard questionnaires were used to evaluate the burnout level and perceived stress. The sample consisted of 146 female undergraduate students (mean age = 20.02 years, SD = 0.01) from a university located in the southwest China. The participants were divided into mind-body exercise group (n = 91) and control group (n = 55). Of which, 62.3% of the participants comprised the mind-body exercise group. And 37.7% of the participants were allocated to the control group.

## 2.2 Exercise and Control Conditions

The intervention was composed of 90-min mind-body exercise (Baduanjin) three times per week for 12 weeks. The exercise program included a warm up (10 min), Baduanjin movements (70 min) and relaxation (10 min). The whole set of Baduanjin exercise contained ten postures with ready position and ending posture. The participants were instructed to practice mind-body exercise with a qualified coach. The training scheme was in accordance with previous study [19]. Participants in the control group maintained an unaltered lifestyle.

## 2.3 Measures

Burnout symptoms: the validated Chinese version of the Maslach Burnout Inventory-Student Survey (MBI-SS) was used to examine the burnout symptoms, which includes three dimensions: emotional exhaustion, cynicism and academic efficacy [23]. Each item has 7-point Likert scale, ranging from 0 (never) to 6 (always). Burnout was expressed by higher subscale scores on emotional exhaustion (five items) and cynicism (4 items), and low scores on academic efficacy (6 items). In this study, the MBI-SS scale demonstrated a good internal consistency (Cronbach's alpha = 0.73).

Perceived stress: the validated Chinese version of the 10-item perceived stress scale was used to assess stress [24,25]. Responses were given on a 5-point Likert scale, ranging from 0 (never) to 4 (always), representing how often they have felt or thought about some events in the last month. A total score ranged from zero to 40, and higher points represent greater perceived stress. In this study, the perceived stress scale demonstrated a good internal consistency (Cronbach's alpha = 0.78).

## 2.4 Statistical Analysis

All statistical analyses were conducted using the SPSS 25.0 software (IBM Corporation, Chicago, IL). The continuous variables were expressed as mean  $\pm$  SD, and categorical variables were expressed as frequency. Descriptive statistics were computed using independent sample *t*-test or chi-square test at baseline. The normality of the variables was tested. Changes in mean scores within the group from baseline to post were examined using paired-sample *t*-tests. Effect sizes were calculated to explain the magnitudes of Baduanjin intervention effect. Effect size was classified as small ( $0.20 \leq d < 0.50$ ), moderate ( $0.50 \leq d < 0.80$ ) and large ( $0.80 \leq d$ ) [26]. The statistically significant level of *p*-value was set as 0.05.

## 3 Results

### 3.1 Demographics

One-hundred-forty-six female undergraduate students (mind-body exercise group,  $n = 91$ ; control group,  $n = 55$ ) were recruited at the baseline assessment. Their mean age was  $19.97 \pm 0.96$  years in the mind-body exercise group and  $20.07 \pm 0.98$  years in the control group. [Tab. 1](#) depicts participant features. No significant group differences were observed ( $p < 0.05$ ).

**Table 1:** Participant characteristics of mind-body exercise group and control group

Characteristics	Mind-body exercise $n = 91$	Control $n = 55$	Statistic ( <i>df</i> )	<i>p</i> -value
Age (year)	$19.97 \pm 0.96$	$20.07 \pm 0.98$	$t(144) = 0.14$	0.89
Burnout				
Emotional exhaustion	$9.35 \pm 3.00$	$8.89 \pm 2.98$	$t(144) = 0.90$	0.37
Cynicism	$7.99 \pm 4.16$	$6.96 \pm 3.86$	$t(144) = 1.48$	0.14
Academic efficacy	$20.43 \pm 4.42$	$20.96 \pm 6.50$	$t(144) = 0.59$	0.56
Perceived Stress	$19.33 \pm 5.12$	$18.04 \pm 4.35$	$t(144) = 1.58$	0.12

(Continued)

**Table 1 (continued).**

Characteristics	Mind-body exercise n = 91	Control n = 55	Statistic ( <i>df</i> )	<i>p</i> -value
Family			$\chi^2(1) = 1.40$	0.236
Single child	14(15.4%)	4(7.3%)		
Sibling	77(84.6%)	51(92.7%)		
Born			$\chi^2(1) = 0.02$	0.899
Village	72(79.1%)	44(80%)		
City	19(20.9%)	11(20%)		
Daily Mobile Phone Use			$\chi^2(5) = 1.53$	0.910
<3	1(1.1%)	1(1.8%)		
3–4	16(17.6%)	8(14.5%)		
4–6	34(37.3%)	24(43.6%)		
6–8	28(30.8%)	13(23.6%)		
8–10	8(8.8%)	6(10.9%)		
>10	4(4.4%)	3(5.5%)		

Note: sample frequencies are displayed for each categorical variable; sample mean (M) and standard deviation (SD) are displayed for each continuous variable.

Tab. 2 presents the changed outcomes in burnout (emotional exhaustion, cynicism and academic efficacy) and perceived stress from baseline to post-intervention in the mind-body exercise group and control group.

**Table 2:** Outcome measures for the mind-body exercise group (n = 91) and the control group (n = 55)

Outcomes		Baseline	Post-intervention	Mean change	Effect size (Cohen's d)	Between groups differences (ANCOVA)
Emotional exhaustion	Mind-body exercise	9.35 ± 3.00	5.86 ± 3.55	-3.49 ± 3.87**	1.06	$F = 24.2, p < 0.001$
	Control	8.89 ± 2.98	9.18 ± 5.34	0.29 ± 5.44	-0.07	
Cynicism	Mind-body exercise	7.99 ± 4.16	5.31 ± 2.94	-2.68 ± 3.89**	0.74	$F = 4.53, p = 0.035$
	Control	6.96 ± 3.86	6.13 ± 4.39	-0.83 ± 5.62	0.20	
Academic efficacy	Mind-body exercise	20.43 ± 4.42	19.55 ± 5.91	-0.88 ± 6.56	0.17	$F = 36.0, p < 0.001$
	Control	20.96 ± 6.50	12.47 ± 8.94	-8.49 ± 9.83**	1.09	
Perceived stress	Mind-body exercise	19.33 ± 5.12	10.55 ± 9.32	-8.78 ± 10.77**	1.17	$F = 34.4, p < 0.001$
	Control	18.04 ± 4.35	17.57 ± 4.92	-0.47 ± 6.40	0.10	

Note: \*\*,  $p < 0.001$

After a 12-week intervention, the emotional exhaustion score significantly decreased by 37.3% ( $p < 0.001$ ) with a large effect size ( $d = 1.06$ ) in the mind-body exercise group. The cynicism score was

significantly reduced accordingly by 33.5% ( $p < 0.001$ ) with a moderate effect size ( $d = 0.74$ ) in the mind-body exercise group. In addition, compared with control group, mind-body exercise showed significantly greater decreases in emotional exhaustion ( $p < 0.001$ ) and cynicism ( $p = 0.035$ ).

Both mind-body exercise group (mean score decreased by 4.3%) and control group (mean score decreased by 40.5%) had lower scores in academic efficacy at post-intervention than at baseline. Only a significantly decreased academic efficacy score was observed in control group compared with the mind-body exercise group ( $p < 0.001$ ).

After a 12-week intervention, there was a significant decrease in level of perceived stress in the mind-body exercise group compared with the control group ( $p < 0.001$ ). The mind-body exercise group had a lower score on perceived stress at post-intervention than at baseline (mean score decreased by 45.4%,  $p < 0.001$ ). Regarding the intervention magnitude, a large effect size ( $d = 1.17$ ) was observed for the perceived stress.

#### 4 Discussion

Burnout among undergraduate students has become an important psychological problem, indicating that burnout can affect academic achievement [27]. This study aimed to examine the effects of the mind-body exercise (Baduanjin) on burnout and perceived stress in female undergraduate students. The findings showed that burnout symptoms (emotional exhaustion and cynicism) and perceived stress were significantly decreased with small-to-large effect sizes from before and after a 12-week mind-body exercise compared with control group. These findings provided supporting data that mind-body exercise was an effective approach for reducing burnout symptoms and perceived stress in female undergraduate students.

Baduanjin exercise, as one type of mindfulness focuses on meditation and attention with low-to-moderate exercise, developing inner awareness during practice [28]. Mindful-based exercise has been documented to improve various health outcomes in college students [19,29,30]. Recently, one controlled study by Zhan offered a similar protocol to investigate the effect of Yoga on burnout in 241 female college students. After 3-month intervention, significantly reduced emotional exhaustion and cynicism scores were observed [29]. Another randomized controlled study confirmed the positive effects of Tai Chi on reducing burnout in middle school students [31]. During practicing the mind-body exercise, practitioners payed more attention on the continued movements, breathing patterns and mind, creating an awareness (mindfulness) of ignoring bad events. Subsequently, student emotional states and negative feelings are relaxed and returned to be calmness after practicing Baduanjin exercise. Indeed, the efficacy of mind-body exercise is to get people to pay attention to their negative thoughts and feelings without judgment, which can help practitioners prevent the occurrence of burnout (e.g., emotional exhaustion) [32,33]. With respect to academic efficacy, the mind-body exercise group had a slightly decreased academic efficacy score, but it was not a significant compared to the control group. It implied that mind-body exercise has a stabilizing effect on academic efficacy. Further studies are needed to further corroborate the effect of mind-body exercise on academic efficacy among female undergraduate students.

In addition, our results suggest that female undergraduate students can obtain the benefit of reducing stress from practicing mind-body exercise (Baduanjin). The finding is in accordance with previous studies, which concluded that Baduanjin exercise contributed to reducing stress [34,35]. This remarkably effective result is attributed to the unique modalities of Baduanjin exercise as mentioned earlier. These segments of exercise have a significant effect on alleviating stress [20,36]. Wang et al. indicated that while practicing Baduanjin exercise, practitioners need to coordinate breathing with movements to improve long and deep rhythmic breathing. The improved breathing regulation can effectively regulate the autonomic nervous system and control emotions [36]. Furthermore, a recent neuroscience study using an animal model concluded that rhythmic breathing can promote mental calming, suppress stress behavior, and influence higher order brain

function [36]. Significant results from the experimental group support previous findings and lead us to believe that mind-body exercise may help students reduce perceived stress.

For this current study, several limitations deserve attention. First, it is remarkable that our study is not a randomized controlled study, leading to a certain bias in the results. Second, the sample consists of female undergraduate students, the findings may not be universal enough to be applied to other population. Third, our study used self-report scales to examine dependent variables, inevitably bias could be present in the process of the research. Fourth, we did not conduct follow-up monitoring to investigate participant burnout and stress states after cessation of the study due to limited funding.

## 5 Conclusion

In conclusion, the findings of this study indicate that a 12-week mind-body exercise has a positive effect on reducing academic burnout (emotional exhaustion and cynicism) and perceived stress in female undergraduate students. Considering the fact that undergraduate students face increasing academic pressure at present, mind-body exercise (Baduanjin) program could be a practical approach to reduce student burnout and mental health concerns.

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**Conflicts of Interest:** The authors declare that they have no conflicts of interest to report regarding the present study.

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