Effect of Moderate-Intensity Continuous Training on Heart Rate Variability and Autonomic Function in College Students: An Interventional Study

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Abstract: ***Background**: Heart Rate Variability (HRV) reflects autonomic nervous system balance and is an important indicator of cardiovascular and psychological health. Reduced HRV is commonly associated with stress and anxiety among college students. Moderate-Intensity Continuous Training (MICT) has been proposed as an effective intervention for improving autonomic regulation. **Aim**: To evaluate the effect of an 8-week Moderate-Intensity Continuous Training (MICT) program on HRV among college students. **Methods**: This interventional pre-post study included 70 college students aged 18-35 years. Baseline anthropometric, cardiovascular, and HRV parameters were recorded before intervention. Participants underwent an 8-week MICT program involving regular moderate-intensity aerobic exercise. HRV parameters including SDNN, RMSSD, NN50, pNN50, LF, HF, LF/HF ratio, total power, and mean R-R interval were assessed before and after intervention. Statistical analysis was performed using SPSS software. **Results**: After 8 weeks of MICT, significant improvement was observed in HRV indices indicating enhanced parasympathetic activity and autonomic balance. RMSSD, HF power, NN50, and pNN50 increased, while LF/HF ratio and resting pulse rate showed a declining trend. Improvements in mean R-R interval and total HRV power were also noted. Modest reductions in blood pressure were observed following intervention. **Conclusion**: Moderate-Intensity Continuous Training significantly improved HRV and autonomic regulation among college students. Regular MICT may be an effective non-pharmacological strategy for improving cardiovascular health, stress resilience, and autonomic function in young adults.***

Keywords: Heart Rate Variability, Moderate-Intensity Continuous Training, Autonomic Nervous System, College Students, Cardiovascular Health, Exercise Intervention

1. Introduction

The college period is an important phase of personal and academic growth; however, it is also associated with considerable psychological stress. Students commonly experience academic pressure, financial difficulties, social challenges, and uncertainty about the future, all of which contribute to increased levels of stress, anxiety, and depression [1, 2]. The COVID-19 pandemic further intensified these mental health problems among university students [1]. Therefore, there is a growing need for simple, accessible, and non-pharmacological approaches to improve both mental and physical well-being in this population.

Physical exercise is widely recognized as an effective strategy for improving mental health. Several studies have shown that regular exercise can reduce symptoms of anxiety, stress, and depression while improving overall psychological well-being [3, 4]. Although the beneficial effects of exercise are well established, the physiological mechanisms responsible for these improvements are still being explored. One important mechanism is believed to involve Heart Rate Variability (HRV), which is considered a reliable indicator of autonomic nervous system (ANS) function.

Heart Rate Variability refers to the variation in time intervals between consecutive heartbeats. A higher HRV generally indicates better cardiovascular adaptability and autonomic balance, while a lower HRV is associated with stress, anxiety, poor emotional regulation, and increased sympathetic nervous system activity [5–8]. HRV reflects the balance between the sympathetic nervous system, which prepares the body for stress and the parasympathetic nervous system, which promotes relaxation and recovery. Therefore, improving HRV is considered important for enhancing both cardiovascular and psychological health [5, 6].

Exercise has been shown to positively influence autonomic function and HRV. Previous studies have demonstrated improvements in HRV following exercise therapy, resistance training, and aerobic exercise interventions [9–11]. Moderate Intensity Continuous Training (MICT), which includes activities such as brisk walking, jogging, and cycling performed at moderate intensity for a sustained duration, is a practical and widely recommended form of exercise [12]. Compared to high-intensity exercise programs, MICT may be easier to perform and maintain, especially among college students.

Despite increasing evidence supporting exercise-based interventions, limited studies have specifically evaluated the effect of structured MICT programs on HRV among healthy college students [13, 14]. Considering the increasing prevalence of sedentary lifestyles, stress, and mental health concerns in this population, understanding the role of moderate-intensity exercise in improving autonomic balance is of significant clinical and public health importance [1, 7].

$$n = \frac{(Z_{\alpha/2}+Z_\beta)^2 \times 2\sigma^2}{d^2}$$

Where,
n= Required Sample Size
$Z_{\alpha/2}$= Standard normal deviate at 95% confidence interval (1.96)
Z_β= Standard normal deviate at 80% statistical power (0.84)
σ= Standard deviation obtained from previous literature
d= Expected mean difference after intervention

Therefore, the present study was conducted to evaluate the effect of an 8-week Moderate Intensity Continuous Training program on Heart Rate Variability among college students. It was hypothesized that regular participation in MICT would improve HRV parameters, indicating enhanced parasympathetic activity and better autonomic regulation.

2. Materials & Methods

2.1 Study Design and Setting

This interventional pre–post analytical study was conducted in the Department of Physiology, King George's Medical University (KGMU), Lucknow, Uttar Pradesh, India, to evaluate the effect of Moderate-Intensity Continuous Training (MICT) on Heart Rate Variability (HRV) among college students. The study was carried out over a period of 8 weeks following institutional ethical approval.

2.2 Study Population

A total of 70 college students aged between 18 and 35 years were enrolled in the study. Participants were recruited from various colleges and academic institutions associated with the university through voluntary participation.

Inclusion Criteria
- College students aged 18–35 years
- Apparently healthy individuals willing to participate in the study
- Participants able to perform moderate-intensity physical activity
- Individuals providing written informed consent

Exclusion Criteria
- History of cardiovascular, respiratory, endocrine, neurological, or psychiatric disorders
- History of smoking, alcohol abuse, or substance dependence
- Individuals on medications affecting autonomic function or cardiovascular parameters
- Participants engaged in regular athletic training or structured exercise programs
- Individuals unwilling to continue the exercise protocol or follow-up assessments

2.3 Sample Size

Sample Size Calculation
The sample size for the present study was calculated considering the expected improvement in Heart Rate Variability (HRV) parameters following Moderate-Intensity Continuous Training (MICT) among healthy college students. Since the study employed a pre–post interventional design, the calculation was based on paired observations.

A confidence interval of 95% and a statistical power of 80% were considered for detecting a significant difference in HRV parameters before and after intervention. A moderate effect size was assumed based on previous studies evaluating exercise-induced autonomic modulation in young adults.

The sample size was estimated using the formula:

To compensate for inter-individual variability and potential participant dropout during the 8-week intervention period, the sample size was increased. Finally, 70 participants fulfilling the eligibility criteria were enrolled in the study.

$$BMI = \frac{Weight\,(kg)}{Height\,(m)^2}$$

Ethical Considerations
The study protocol was reviewed and approved by the Institutional Ethics Committee of King George's Medical University, Lucknow. Written informed consent was obtained from all participants prior to enrollment. Confidentiality and anonymity of participants were maintained throughout the study.

Baseline Assessment
Detailed demographic and clinical history of all participants was recorded prior to intervention. Anthropometric measurements including height, weight, and Body Mass Index (BMI) were assessed using standardized methods.

Anthropometric Measurements
- **Height:** Measured in centimeters using a stadiometer with participants standing barefoot.
- **Weight:** Measured in kilograms using a calibrated weighing scale.
- **Body Mass Index (BMI):** Calculated using the formula:

Cardiovascular Parameters
Resting cardiovascular parameters including systolic blood pressure (SBP), diastolic blood pressure (DBP), and pulse rate were measured in a quiet environment after adequate rest.

Blood pressure was recorded using a standard sphygmomanometer in sitting position. Pulse rate was measured manually and confirmed through electrocardiographic recordings.

Heart Rate Variability Assessment
Heart Rate Variability (HRV) analysis was performed before and after completion of the 8-week MICT intervention.

Participants were instructed to avoid caffeine, heavy meals, alcohol, and strenuous physical activity for at least 12 hours prior to HRV recording. All recordings were conducted in a quiet room under controlled environmental conditions.

After 10-15 minutes of supine rest, electrocardiogram (ECG) recordings were obtained. HRV analysis was performed using R-R interval recordings derived from ECG.

Time-Domain Parameters

The following time-domain HRV parameters were assessed:
- Mean R-R interval
- SDNN (Standard Deviation of NN intervals)
- RMSSD (Root Mean Square of Successive Differences)
- NN50
- pNN50

Frequency-Domain Parameters

Frequency-domain analysis included:
- Total Power
- Very Low Frequency (VLF)
- Low Frequency (LF)
- High Frequency (HF)
- LF normalized units (LF nu)
- HF normalized units (HF nu)
- LF/HF ratio

These parameters were used to assess sympathetic and parasympathetic modulation of cardiac autonomic activity.

Intervention Protocol

Participants underwent an 8-week Moderate-Intensity Continuous Training (MICT) program.

The exercise protocol consisted of moderate-intensity aerobic activities including brisk walking, jogging, cycling, or similar continuous aerobic exercises performed regularly under supervision and guidance.

Participants were instructed to perform exercise sessions for approximately 30-40 minutes per session, 4-5 times per week. Exercise intensity was maintained at approximately 50–70% of maximum heart rate, corresponding to moderate-intensity aerobic activity.

Participants were encouraged to maintain adherence to the exercise schedule throughout the intervention period. Compliance and regularity of exercise sessions were monitored periodically.

Outcome Measures

Primary Outcome
- Change in Heart Rate Variability (HRV) parameters after 8 weeks of MICT

Secondary Outcomes
- Changes in resting pulse rate
- Changes in systolic and diastolic blood pressure
- Changes in autonomic balance reflected by LF/HF ratio
- Changes in parasympathetic activity indicators including RMSSD and HF power

Statistical Analysis

Data were entered into Microsoft Excel and analyzed using Statistical Package for Social Sciences (SPSS) software. Continuous variables were expressed as mean ± standard deviation (SD). Pre- and post-intervention values were compared using appropriate statistical tests. A p-value of <0.05 was considered statistically significant. Graphical and tabular representations were used for interpretation of HRV and cardiovascular parameters before and after intervention.

3. Result

Table 1: Baseline Demographic Characteristics of Study Participants

Variable	Category	Number (n)	Percentage (%)
Age	18-25 years	38	54.3
Age	26-35 years	32	45.7
Gender	Male	47	67.1
Gender	Female	23	32.9
BMI	18.5-21.5 kg/m²	25	35.7
BMI	21.6-24.9 kg/m²	45	64.3

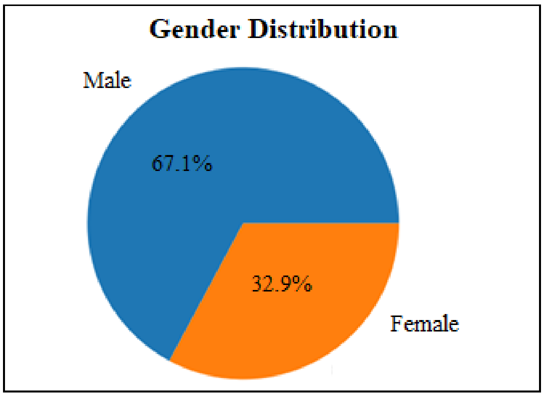

Figure 1: Gender Distribution of Participants

The majority of participants belonged to the 18-25 years age group (54.3%), while 45.7% were between 26–35 years, indicating a relatively balanced age distribution within the study population. Male participants constituted 67.1% of the study population, whereas females accounted for 32.9%. Most participants (64.3%) had a BMI within 21.6–24.9 kg/m², while 35.7% had a BMI between 18.5- 21.5 kg/m².

Table 2: Pre- and Post-Intervention Comparison of HRV Parameters

Parameter	Pre-Intervention Mean ± SD	Post-Intervention Mean ± SD	Mean Change	p-value
SBP (mmHg)	102.07 ± 8.60	100.13 ± 8.58	-1.94	<0.001*
DBP (mmHg)	70.09 ± 6.22	68.36 ± 6.20	-1.73	<0.001*
Pulse (bpm)	78.60 ± 12.12	73.60 ± 12.12	-5	<0.001*
Mean R-R	814.19 ± 118.48	834.19 ± 118.48	20	<0.001*
SDNN	124.47 ± 44.01	124.47 ± 44.01	0	1
RMSSD	144.63 ± 64.58	154.63 ± 64.58	10	<0.001*
NN50	153.43 ± 83.42	158.43 ± 83.42	5	<0.001*
pNN50	42.75 ± 21.58	44.75 ± 21.58	2	<0.001*
Total Power	2831.51 ± 1086.51	2931.51 ± 1086.51	100	<0.001*
VLF	1859.33 ± 1065.47	1980.76 ± 1110.28	121.43	0.012*

LF	837.37 ± 395.94	862.88 ± 393.81	25.51	0.093
HF	420.44 ± 176.07	443.34 ± 182.42	22.9	<0.001*
LF norm	57.70 ± 18.53	51.27 ± 14.08	-6.43	<0.001*
HF norm	43.73 ± 14.08	48.73 ± 14.08	5	<0.001*
LF/HF Ratio	2.20 ± 1.08	1.85 ± 1.29	-0.35	<0.001*

*Statistical significant

The paired t-test analysis demonstrated significant improvements in multiple cardiovascular and HRV parameters following the 8-week MICT intervention. Systolic and diastolic blood pressure showed significant reductions ($p < 0.001$). Resting pulse rate also decreased significantly after intervention, indicating improved cardiovascular efficiency.

Among time-domain HRV parameters, Mean R-R interval, RMSSD, NN50, and pNN50 increased significantly following intervention ($p < 0.001$), suggesting enhanced parasympathetic modulation. However, SDNN did not show a statistically significant change ($p = 1.000$).

Frequency-domain analysis revealed a significant increase in total power, VLF, and HF components, whereas LF power demonstrated a non-significant increase ($p = 0.093$). Furthermore, LF normalized units and LF/HF ratio decreased significantly, while HF normalized units increased significantly, indicating a shift toward parasympathetic dominance and improved autonomic balance following MICT.

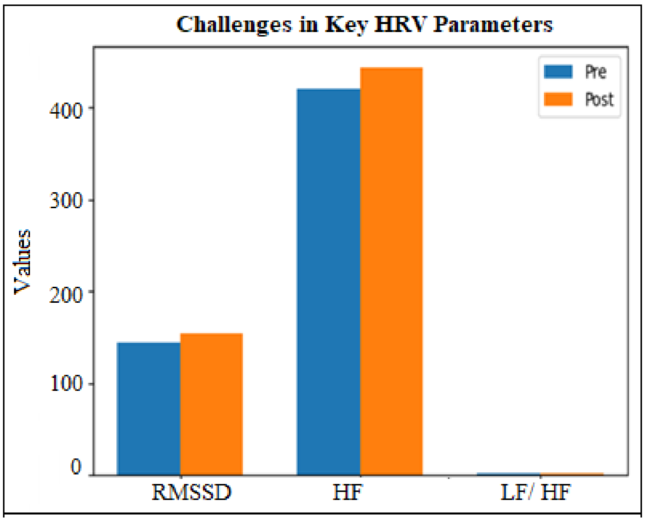

Figure 2: Pre- vs Post-Intervention Cardiovascular Parameters

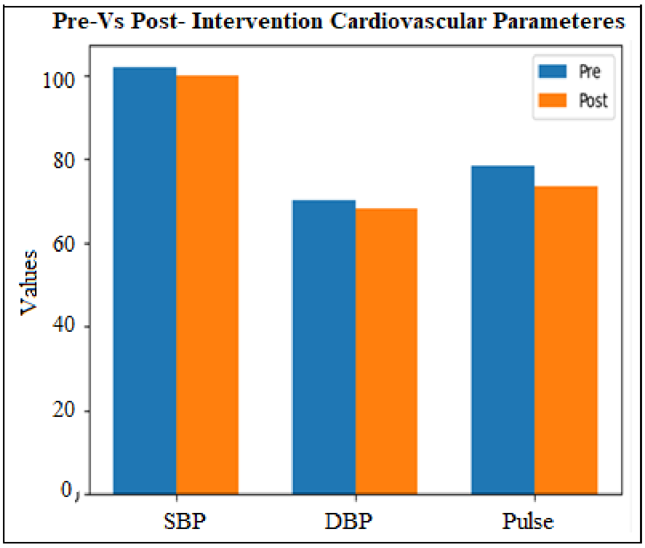

Figure 3: Changes in Key HRV Parameters

Table 3: Agewise Comparison of HRV and Other Parameters Changes

Pre to post intervention change	18 - 25 years		26 - 35 years		Mann Whitney test	
	Mean	SD	Mean	SD	z-value	p-value
SBP	-1.92	0.49	-1.97	0.18	-0.1	0.919
DBP	-1.47	2.54	-2.03	0.18	-1.68	0.093
Pulsebpm	-5	0	-5	0	0	1
MeanRR	20	0	20	0	0	1
SDNN	0	0	0	0	0	1
RMSSD	10	0	10	0	0	1
NN50	5	0	5	0	0	1
pNN50	2	0	2	0	0	1
TotalPower	100	0	100	0	0	1
VLF	155.26	508.81	81.25	176.78	-0.45	0.65
LF	31.99	56.21	17.81	176.01	-0.68	0.498
HF	24.82	22.65	20.63	29.61	-0.96	0.337
LFnorm	-5	0	-8.13	17.68	-1.09	0.276
HFnorm	5	0	5	0	0	1
LF/HF	-0.43	0.4	-0.25	0.62	-1.48	0.139

The pre-to-post intervention changes in various cardiovascular and heart rate variability (HRV) parameters were compared between the 18–25 years and 26–35 years age groups using the Mann-Whitney test. There was no significant difference in the reduction of systolic blood pressure (SBP) between the two age groups (-1.92 ± 0.49 vs. -1.97 ± 0.18; p = 0.919) or diastolic blood pressure (DBP) (-1.47 ± 2.54 vs. -2.03 ± 0.18; p = 0.093). Similarly, pulse rate, mean R-R interval, SDNN, RMSSD, NN50, pNN50, and total power changes were identical across both groups, as indicated by p-values of 1.000. Among the frequency-domain parameters, VLF, LF, and HF changes did not show significant differences between the age groups (p = 0.650, p = 0.498, and p = 0.337, respectively). Additionally, the changes in normalized LF (LF norm), normalized HF (HF norm), and the LF/HF ratio were not significantly different between the groups (p = 0.276, p = 1.000, and p = 0.139, respectively). Overall, the results indicate that both age groups experienced similar improvements in cardiovascular and HRV parameters following the intervention, with no statistically significant differences in response between the two age categories.

Table 4: Gender-wise Comparison (Mann-Whitney Test)

Parameter	Male Mean	Male SD	Female Mean	Female SD	z-value	p-value
SBP (mmHg)	-1.91	0.46	-2.0	0.0	563.5	0.33
DBP (mmHg)	-1.91	0.75	-1.35	3.13	517.0	0.413
Pulse (bpm)	-5.0	0.0	-5.0	0.0	540.5	1.0
Mean R-R	20.0	0.0	20.0	0.0	540.5	1.0
SDNN	0.0	0.0	0.0	0.0	540.5	1.0
RMSSD	10.0	0.0	10.0	0.0	574.0	0.428
NN50	5.0	0.0	5.0	0.0	540.5	1.0
pNN50	2.0	0.0	2.0	0.0	540.0	1.0
Total Power	100.0	0.0	100.0	0.0	575.0	0.141
VLF	135.11	458.25	93.48	208.51	529.5	0.744
LF	35.44	54.05	5.23	205.85	513.5	0.614
HF	23.68	24.73	21.3	28.81	541.5	0.991
LF norm	-5.0	0.0	-9.35	20.85	618.0	0.081
HF norm	5.0	0.0	5.0	0.0	529.0	0.503
LF/HF	-0.38	0.53	-0.28	0.49	484.0	0.395

The pre-to-post intervention changes in various cardiovascular and heart rate variability (HRV) parameters were compared between the 18-25 years and 26-35 years age groups using the Mann-Whitney test. There was no significant difference in the reduction of systolic blood pressure (SBP) between the two age groups (-1.91 ± 0.46 vs. -2.00 ± 0.0; p = 0.33) or diastolic blood pressure (DBP) (-1.91 ± 0.75 vs. -1.35 ± 3.13; p = 0.41). Similarly, pulse rate, mean R-R interval, SDNN, RMSSD, NN50, pNN50, and total power changes were identical across both groups, as indicated by p-values of 1.000. Among the frequency-domain parameters, VLF, LF, and HF changes did not show significant differences between the age groups (p = 0.744, p = 0.614, and p = 0.991, respectively). Additionally, the changes in normalized LF (LF norm), normalized HF (HF norm), and the LF/HF ratio were not significantly different between the groups (p = 0.081, p = 0.503, and p = 0.395, respectively). Overall, the results indicate that both age groups experienced similar improvements in cardiovascular and HRV parameters following the intervention, with no statistically significant differences in response between the two age categories.

4. Discussion

The present study evaluated the effect of Moderate Intensity Continuous Training (MICT) on autonomic nervous system modulation in terms of Heart Rate Variability (HRV) among 70 participants. The findings demonstrated significant improvements in several HRV indices and cardiovascular parameters following the exercise intervention, suggesting enhanced parasympathetic activity and reduced sympathetic dominance.

The age distribution of the study population showed that the majority of participants belonged to the 18–25 years age group (54.3%), while 45.7% were between 26–35 years. This relatively young population is particularly suitable for evaluating exercise-induced autonomic adaptations because HRV generally declines with advancing age due to progressive reduction in parasympathetic activity and increased sympathetic dominance. Within this comparatively narrow age range, baseline HRV remains relatively stable, allowing observed improvements to be more confidently attributed to exercise intervention rather than age-related physiological decline. Similar findings were reported by Ramírez-Vélez et al. (2017), who demonstrated significant improvement in HRV following moderate- and high-intensity exercise training among young inactive adults [15]. Likewise, Alansare et al. (2018) observed that both high-intensity interval training (HIIT) and moderate-intensity continuous training increased parasympathetic activity in young adults, supporting the responsiveness of this age group to exercise-induced autonomic modulation [16].

The gender distribution revealed a predominance of males (67.1%) compared to females (32.9%). Previous studies have reported gender-related differences in autonomic regulation, with females often demonstrating relatively greater vagal modulation at rest, whereas males tend to exhibit comparatively higher sympathetic activity. Nevertheless, both sexes consistently demonstrate improvement in HRV following regular exercise training. Teixeira do Amaral et al. (2021) and Coswig et al. (2020) reported comparable enhancement in HRV among both male and female participants after structured exercise programs [17, 18]. Therefore, although the present study included a greater proportion of male participants, gender differences were unlikely to have significantly influenced the direction of autonomic improvement observed after intervention. However, future studies with more balanced gender representation may further clarify sex-specific autonomic responses to exercise.

The BMI distribution demonstrated that most participants (64.3%) had BMI values between 21.6–24.9 kg/m², while 35.7% had BMI between 18.5–21.5 kg/m². Body composition plays an important role in autonomic regulation, as individuals with normal BMI generally exhibit better baseline HRV and parasympathetic activity than overweight or obese individuals. Ramírez-Vélez et al. (2020) reported that overweight adults demonstrated significant improvements in HRV and cardiometabolic parameters following structured exercise intervention, although the degree of improvement was smaller compared to normal-weight individuals [19]. The predominantly normal-BMI population in the present study may therefore have facilitated clearer observation of exercise-induced autonomic enhancement without substantial metabolic confounding. Similar findings have been reported by Besnier et al. (2019) and Deng et al. (2024), who demonstrated significant HRV improvement after exercise interventions in both healthy and clinical populations [20, 21]. Lavie et al. (2019) further emphasized that regular physical activity reduces the adverse cardiovascular effects of sedentary behavior through improvement in vagal modulation and autonomic balance [22].

The most important findings of the present study were the significant improvements observed in cardiovascular and HRV parameters following the 8-week MICT intervention. Resting pulse rate, systolic blood pressure, and diastolic blood pressure showed significant reductions after intervention, reflecting improved cardiovascular efficiency and reduced cardiac workload. These findings are consistent with the established cardioprotective effects of regular aerobic exercise [22]. Additionally, the significant increase in Mean R-R interval corresponded with the observed reduction in resting heart rate, indicating improved cardiac autonomic regulation.

Among time-domain HRV parameters, RMSSD, pNN50, NN50, and total power increased significantly after intervention, indicating enhanced parasympathetic activity and improved autonomic flexibility. Increased vagal modulation is associated with improved cardiovascular prognosis and reduced cardiovascular risk [23]. Frequency-domain analysis further demonstrated a significant increase in HF power and HF normalized units, accompanied by a reduction in LF normalized units and LF/HF ratio. These findings strongly suggest a shift toward parasympathetic dominance and improved sympathovagal balance following exercise intervention. Similar observations have been reported in previous studies demonstrating restoration of autonomic balance through exercise-induced enhancement of parasympathetic activity [21, 24]. Although LF power showed a non-significant increase, this finding may indicate that moderate-intensity training predominantly enhances vagal modulation rather than producing marked suppression of sympathetic outflow. This pattern is consistent with findings reported in other moderate-intensity exercise studies [15]. While high-intensity interval training has also shown significant autonomic benefits [16], the present findings confirm that Moderate Intensity Continuous Training remains an effective, practical, and sustainable intervention for improving autonomic function. The underlying physiological mechanisms may involve improved baroreflex sensitivity, neurohormonal adaptations, and enhanced cardiovascular efficiency [26].

Age-wise comparison of intervention response demonstrated no statistically significant differences between the 18–25 years and 26–35 years age groups for any cardiovascular or HRV parameter. Both groups exhibited comparable improvement following the 8-week exercise program. This finding suggests that the autonomic nervous system retains a substantial capacity for positive adaptation to structured moderate-intensity exercise throughout young adulthood. Similar improvements in RMSSD, pNN50, HF power, and LF/HF ratio across both age groups indicate that exercise-induced autonomic enhancement is relatively independent of age within this demographic range. Ramírez-Vélez et al. (2017) similarly reported comparable HRV improvement across different adult age groups following exercise training [16]. These findings support the use of standardized moderate-intensity aerobic exercise programs for improving autonomic function and cardiovascular health in healthy young adults without the need for age-specific modifications [25].

Gender-wise analysis also demonstrated no statistically significant differences in the magnitude of improvement between male and female participants. Both sexes showed similar reductions in blood pressure, resting heart rate, and LF/HF ratio, along with comparable enhancement in parasympathetic markers such as RMSSD and HF power. These findings suggest that the physiological mechanisms responsible for exercise-induced autonomic adaptation are largely similar between genders within healthy young adults. Similar observations were reported by Ramírez-Vélez et al. (2020), who demonstrated beneficial cardiometabolic and autonomic effects of exercise in both males and females [19]. The reduction in LF/HF ratio observed in both genders further supports improved sympathovagal balance and cardiovascular health following regular exercise intervention [22].

5. Limitations and Future Directions

The present study has several limitations. The sample size was relatively small, the study population consisted predominantly of males, and the follow-up duration was limited to the intervention period. Additionally, the absence of a non-exercise control group restricts causal interpretation of the findings. Detailed assessment of exercise intensity and long-term sustainability of autonomic changes was also limited. Future studies should include larger randomized controlled trials comparing different exercise modalities such as HIIT and MICT, with longer follow-up duration and inclusion of additional mechanistic assessments such as baroreflex sensitivity, endothelial function, and ambulatory blood pressure monitoring. Incorporation of psychological and behavioral assessments, including stress, anxiety, fatigue, and mood evaluation, may further strengthen understanding of the relationship between autonomic regulation and mental health [26].

6. Conclusion

The present study demonstrated that Moderate Intensity Continuous Training (MICT) significantly improved Heart Rate Variability and cardiovascular parameters among college students. The intervention enhanced parasympathetic activity, reduced sympathetic dominance, and improved overall autonomic balance, as evidenced by favorable changes in HRV indices including RMSSD, HF power, and LF/HF ratio. These findings suggest that regular moderate-intensity aerobic exercise is an effective non-pharmacological strategy for improving autonomic function, cardiovascular health, and stress resilience in young adults.

Declaration by Authors

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