

## Effect of Mindfulness- Based Cognitive Therapy Training on Physiological Variables of Physical Education Students

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### ABSTRACT

**Aim:** The purpose of the study was to find out the effect of mindfulness based cognitive therapy training on physiological variables of physical education students. **Subjects:** The subjects for this study were selected from the pool of Physical Education students at APS University, with a specific focus on individuals aged 18 to 30 years. A total of 30 subjects were chosen to participate in the study. The selection process ensured that all participants were currently enrolled in the university's Physical Education program. **Methods:** The selection of variables for this study includes vital capacity and blood pressure, each chosen to provide a comprehensive understanding of the impact of Mindfulness-Based Cognitive Therapy (MBCT) was obtained by using Dry Spirometry and Sphygmomanometer. **Hypothesis:** There is no significant change in systolic & diastolic blood pressure and vital capacity levels of Physical Education students before and after MBCT training. **Statistic:** The t-test was applied to compare the mean scores of vital capacity and blood pressure pre-intervention with those post-intervention. The level of significance was set at 0.05. **Conclusion:** Distribution of means of Physiological variables such as Systolic & diastolic Blood pressure and Vital Capacity were compared across before and after training program (pre and post data), it was evident Systolic & diastolic Blood pressure and Vital Capacity were significantly difference in the post test data from compared to Pre-test.

**Keywords-** Systolic & Diastolic Blood pressure and Vital Capacity.

## I. INTRODUCTION

Mindfulness-Based Cognitive Therapy (MBCT) is a therapeutic approach that integrates cognitive therapy with mindfulness strategies to help individuals manage and prevent the recurrence of depression and other mental health issues (Segal et al., 2013). Developed by Zindel Segal, Mark Williams, and John Teasdale, MBCT aims to combine the principles of cognitive therapy with mindfulness practices to create a unique therapeutic approach that emphasizes present-moment awareness and cognitive flexibility (Kuyken et al., 2016).

This essay explores the origins, theoretical foundations, effectiveness, and practical applications of MBCT, highlighting key research findings and theoretical insights (Crane, 2017; Kuyken et al., 2016; Segal et al., 2013).

### Origins and Development

MBCT emerged from the need to address the high recurrence rates of depression. Traditional cognitive therapy, developed by Aaron Beck, focuses on identifying and challenging negative thought patterns (Beck, 1979). However, Beck's approach often requires cognitive restructuring, which may not always be sufficient for preventing relapse in individuals with recurrent depression (Hofmann et al., 2013). MBCT was developed as a response to this challenge. Zindel Segal, Mark Williams, and John Teasdale, the co-creators of MBCT, recognized that while cognitive therapy was effective in treating depression, it did not fully address the issue of relapse (Segal et al., 2013). Their solution was to incorporate mindfulness practices—derived from Eastern contemplative traditions—into cognitive therapy. This integration aimed to help individuals develop a new relationship with their thoughts and feelings, thereby

reducing the risk of relapse (Kabat-Zinn, 2011; Segal et al., 2013).

#### **Practical Applications and Limitations**

MBCT has been successfully implemented in various settings, including clinical practices, community programs, and workplace wellness initiatives (Crane et al., 2017). It has been adapted for different populations, including individuals with anxiety disorders, chronic pain, and substance use issues (Hofmann & Gómez, 2017). However, MBCT is not without limitations. Some critics argue that the mindfulness component may not be as effective for individuals with severe cognitive distortions or those who have difficulty with introspection (Fjorback et al., 2011). Additionally, MBCT requires regular practice and commitment, which may be challenging for some individuals (Kuyken et al., 2016).

#### **Future Directions**

Future research on MBCT should focus on exploring its effectiveness in diverse populations and settings. There is also a need for studies that examine the long-term benefits of MBCT and its impact on various mental health conditions beyond depression. Additionally, research should investigate the mechanisms through which MBCT exerts its effects, including the role of mindfulness in cognitive and emotional regulation.

#### **Objective:-**

The purpose of the study was to find out the effect of mindfulness based cognitive therapy training on physiological variables of physical education students.

## **II. METHODOLOGY**

"The subjects for this study were selected from the pool of Physical Education students at APS University, with a specific focus on individuals aged 18 to 30 years. A total of 30 subjects were chosen to participate in the study. The selection process ensured that all participants were currently enrolled in the university's Physical Education program. This criterion was crucial to guarantee that the participants were actively engaged in physical activities and sports, aligning with the study's objectives to assess the impact of Mindfulness-Based Cognitive Therapy training on physiological variables. By focusing on this specific group, the study aimed to accurately capture the effects of the intervention on individuals who were already involved in regular physical training and athletic activities, thereby providing relevant and specific insights into the benefits of mindfulness practices within this context".

#### **Procedure**

"This study aims to explore the impact of MBCT training on both physiological variables among physical education students. By examining parameters such as Vital Capacity and Blood Pressure, this research seeks to provide a comprehensive understanding of how mindfulness-based interventions can support the holistic health of students in physically demanding educational programs. Through a detailed analysis of these outcomes,

the study aims to contribute valuable insights into the potential of MBCT as a tool for enhancing the well-being and performance of physical education students.

Necessary instructions were given to the students before the execute of the test. Students were ensured that the performance given by them on the test will be kept strictly confidential and would not be disclosed to anyone in any conditions. At the same time researcher inspired the respondents by promising to give a separate reports of the conclusions of his study to each of them. It was clearly described to the subjects that overall objective of the work was to allow each subject to acquire deeper insight into her physiological functioning.

The selection of variables for this study includes Vital Capacity and Blood Pressure, each chosen to provide a comprehensive understanding of the impact of Mindfulness-Based Cognitive Therapy (MBCT)".

#### **Criterion Measures**

| Criterion Measure | Description                                             | Measurement Method | Units  |
|-------------------|---------------------------------------------------------|--------------------|--------|
| Vital Capacity    | Maximum Amount of Air A Person Can Expel from The Lungs | Spirometry         | Liters |
| Blood Pressure    | Force Of Blood Against the Artery Walls                 | Sphygmomanometer   | mmHg   |

The research work was also bordered to the assessment of Vital Capacity performance of the students was obtained by using Dry Spirometry and Blood Pressure was obtained by using Sphygmomanometer. The performance given by the students in the test were separated as tabulated alternatives and thus the table was developed for the analysis of raw scores.

#### **Hypothesis:**

There is no significant change in systolic & diastolic blood pressure and vital capacity levels of Physical Education students before and after MBCT training.

**Data Analysis: Statistical Technique:** studies examining the impact of physical exercise on physiological measures such as vital capacity and blood pressure measured these variables before and after exercise regimens. The t-test was used to determine whether there were statistically significant changes in mean vital capacity or blood pressure within the same group of participants. By focusing on intra-group comparisons, the t-test provided insights into how interventions or conditions influenced these health-related outcomes within individual participants over time. This statistical approach ensured rigorous evaluation of changes within groups, contributing to understanding the effectiveness of interventions or the impact of conditions on physiological variables in past research contexts.

### III. RESULTS

**Table 1- Descriptive statistics of Physiological variable of Students**

| Variables               | Minimum | Maximum | Mean  | SD   |
|-------------------------|---------|---------|-------|------|
| Systolic (BP) Pre Test  | 102     | 138     | 124.2 | 6.12 |
| Systolic (BP) Post Test | 105     | 129     | 120.3 | 4.26 |

Table 1 shows the descriptive statistics of selected Physiological variables of Pre Test and Post Test i.e. Systolic (BP) mean and SD values were  $124.20 \pm 6.12$  and  $120.30 \pm 4.26$ ; respectively. The maximum value is

138 & 129 and minimum Systolic (BP) value is 102 & 105 of Players.

The graphical representation of Physiological variables of Students has been presented in figure 1.

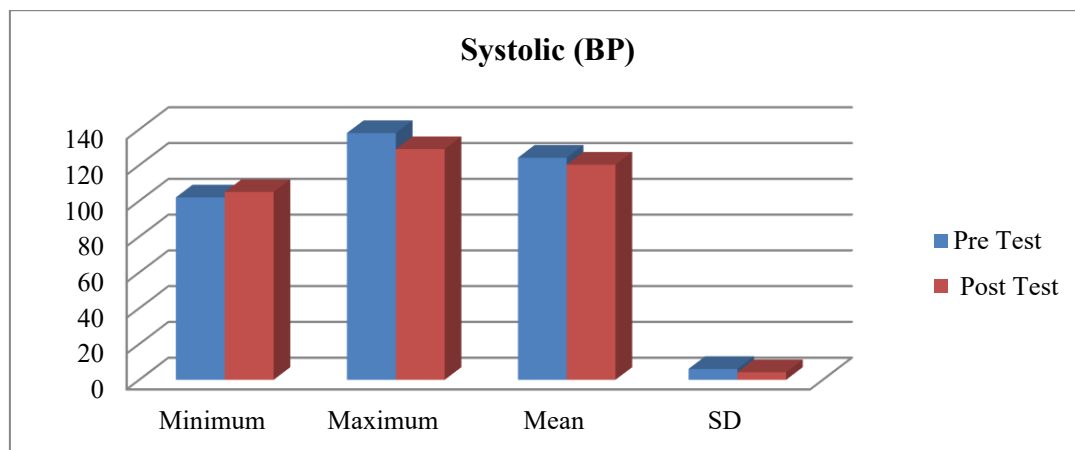


**Figure 1: Descriptive analyses of pre- test and post-test of Students on Systolic blood pressure**

**Table – 2: Significance of difference between Pre and Post Test Performance of Systolic (BP)**

| Groups                    | Test      | Mean  | SD   | SE Mean | DM  | SE Mean Diff. | “t” ratio | Sig. (2-tailed) |
|---------------------------|-----------|-------|------|---------|-----|---------------|-----------|-----------------|
| Systolic (Blood Pressure) | Pre test  | 124.2 | 6.12 | 1.11    | 3.9 | 0.856         | 4.552*    | .000            |
|                           | Post test | 120.3 | 4.26 | 0.777   |     |               |           |                 |

\*Significant at 0.05 level

$t_{.05(29)} = 2.042$

It is evident from Table-2 that there was a significant difference between the means of pre and post-test in Systolic (BP) of Experimental group. The mean difference was calculated as 3.90 and standard error of difference was .856 since the obtained value of paired 't'

(4.552\*) was higher than the tabulated value of 't' (2.042) which was required to be significant at (29) degree of freedom with 0.05 level of confidence.

The graphical representation of mean and standard deviation of pre and post-test performance in Systolic (BP) has been presented in figure 2.

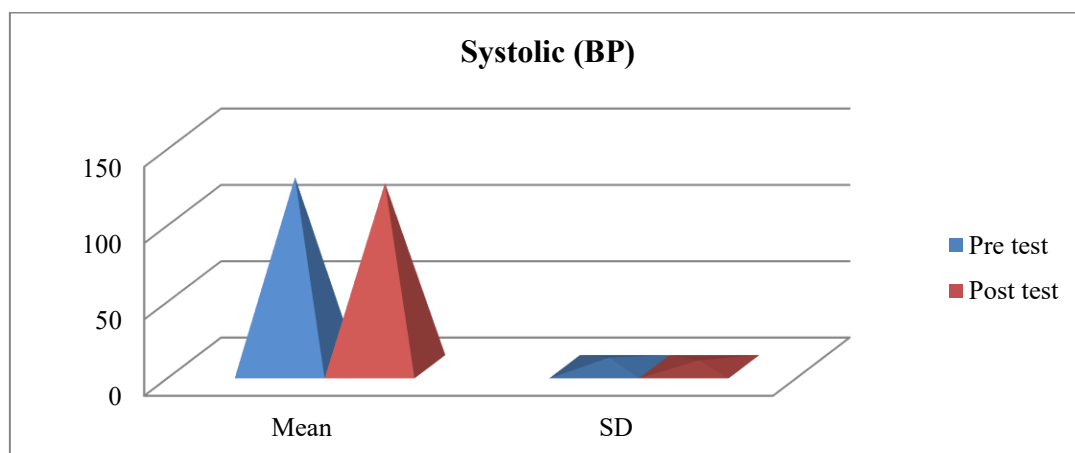


**Figure 2- Comparison of mean and SD scores of pre and post test of training group in Systolic (BP)**

Table 3- Descriptive statistics of Physiological variable of Students

| Variables                | Minimum | Maximum | Mean  | SD   |
|--------------------------|---------|---------|-------|------|
| Diastolic (BP) Pre Test  | 67      | 96      | 83.8  | 6.13 |
| Diastolic (BP) Post Test | 75      | 89      | 80.66 | 3.89 |

Table 3 shows the descriptive statistics of selected Physiological variables of Pre Test & Post Test i.e. Diastolic (BP) mean and SD values were  $83.80 \pm 6.13$  and  $80.66 \pm 3.89$  respectively. The maximum value is 96

& 89 and minimum Diastolic (BP) value is 67 & 75 of Players.

The graphical representation of Physiological variables of Students has been presented in figure 3.

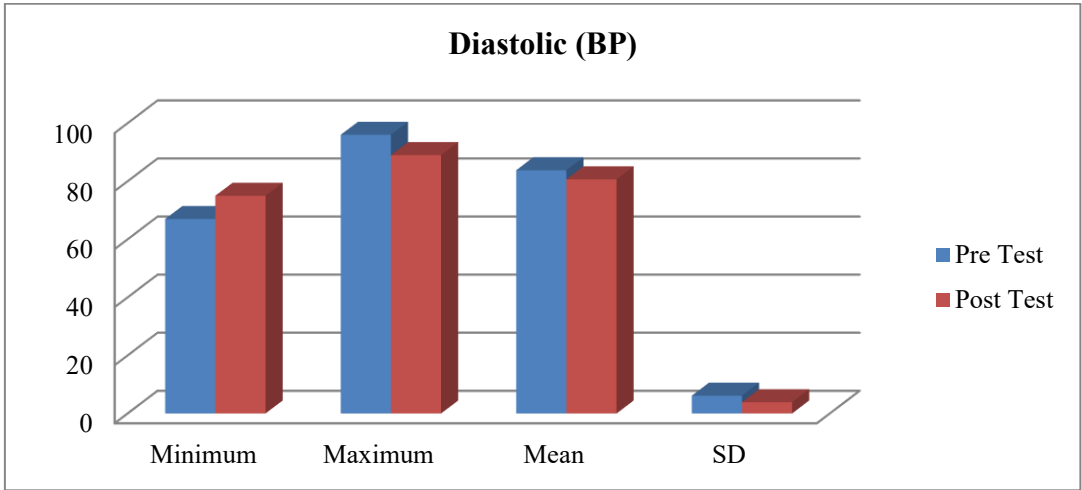


Figure 3- Descriptive analyses of pre-test and post-test of Students on Diastolic blood pressure

Table 4- Significance of difference between Pre and Post Test Performance of Diastolic (BP)

| Groups                    | Test      | Mean  | SD   | SE Mean | DM   | SE Mean Diff. | "t" ratio | Sig. (2-tailed) |
|---------------------------|-----------|-------|------|---------|------|---------------|-----------|-----------------|
| Systolic (Blood Pressure) | Pre test  | 83.80 | 6.13 | 1.12    | 3.13 | .748          | 4.186*    | .000            |
|                           | Post test | 80.67 | 3.89 | .712    |      |               |           |                 |

\*Significant at 0.05 level

$t_{.05}(29) = 2.042$

It is evident from Table-4 that there was a significant difference between the means of pre and post-test in Diastolic (BP) of Experimental group. The mean difference was calculated as 3.13 and standard error of difference was .748 since the obtained value of paired 't' (4.186\*) was higher than the tabulated value of 't' (2.042)

which was required to be significant at (29) degree of freedom with 0.05 level of confidence.

The graphical representation of mean and standard deviation of pre and post-test performance in Diastolic (BP) has been presented in figure 4.

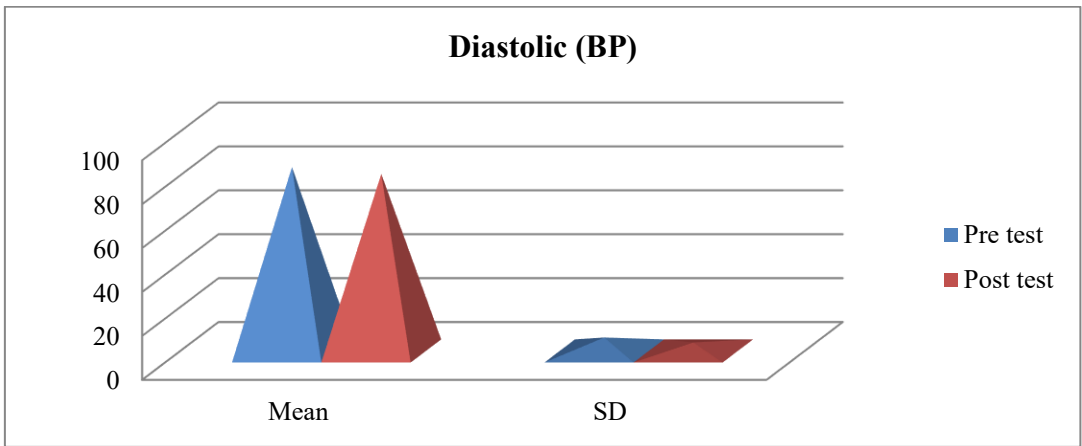


Figure 4-Comparison of mean and SD scores of pre and post-test of training group on Diastolic Blood pressure

Table 5- Descriptive statistics of Physiological variable of Students

| Variables                | Minimum | Maximum | Mean | SD  |
|--------------------------|---------|---------|------|-----|
| Vital Capacity Pre Test  | 3.10    | 4.20    | 3.77 | .64 |
| Vital Capacity Post Test | 3.50    | 5.10    | 4.13 | .43 |

Table 5 shows the descriptive statistics of selected Physiological variables of Pre Test & Post Test i.e. Vital Capacity mean and SD values were  $3.77 \pm .64$  and  $4.13 \pm .43$ ; respectively. The maximum value is 5.10

& 4.20 and minimum Vital Capacity value is 3.10 & 3.50 of Players.

The graphical representation of Physiological variables of Students has been presented in figure 5.

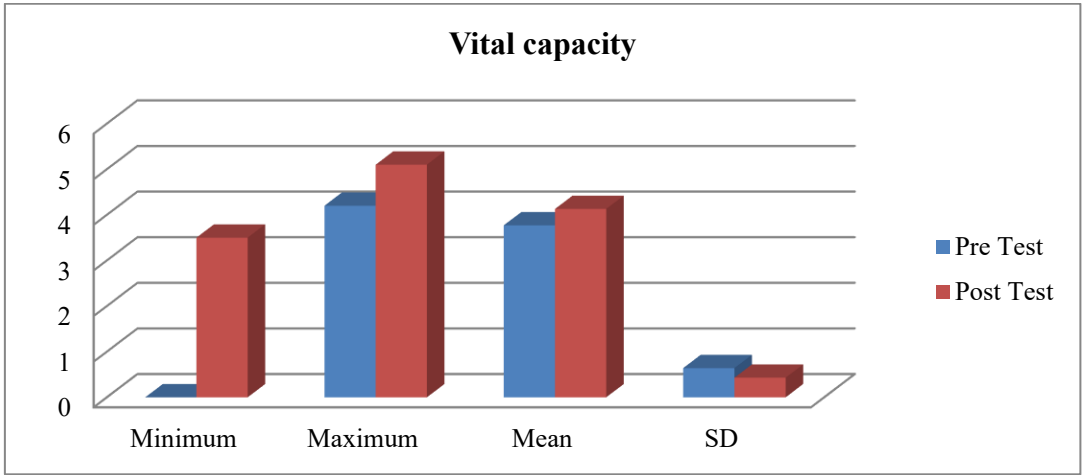


Figure 5-Descriptive analyses of pre-test and post-test of Students on vital capacity

Table 6 -Significance of difference between Pre and Post Test Performance of Vital Capacity

| Groups                    | Test      | Mean | SD  | SE Mean | DM  | SE Mean Diff. | "t" ratio | Sig. (2-tailed) |
|---------------------------|-----------|------|-----|---------|-----|---------------|-----------|-----------------|
| Systolic (Blood Pressure) | Pre test  | 3.77 | .64 | .07     | .36 | .082          | 2.72*     | .474            |
|                           | Post test | 4.13 | .43 | .06     |     |               |           |                 |

\*Significant at 0.05 level

$t_{.05}(29) = 2.042$

It is evident from Table-06 that there was a significant difference between the means of pre and post-test in Vital Capacity of Experimental group. The mean difference was calculated as .36 and standard error of difference was .082 since the obtained value of paired 't' (2.72) was higher than the tabulated value of 't' (2.042)

which was required to be significant at (29) degree of freedom with 0.05 level of confidence.

The graphical representation of mean and standard deviation of pre and post-test performance in Vital Capacity has been presented in figure 06.

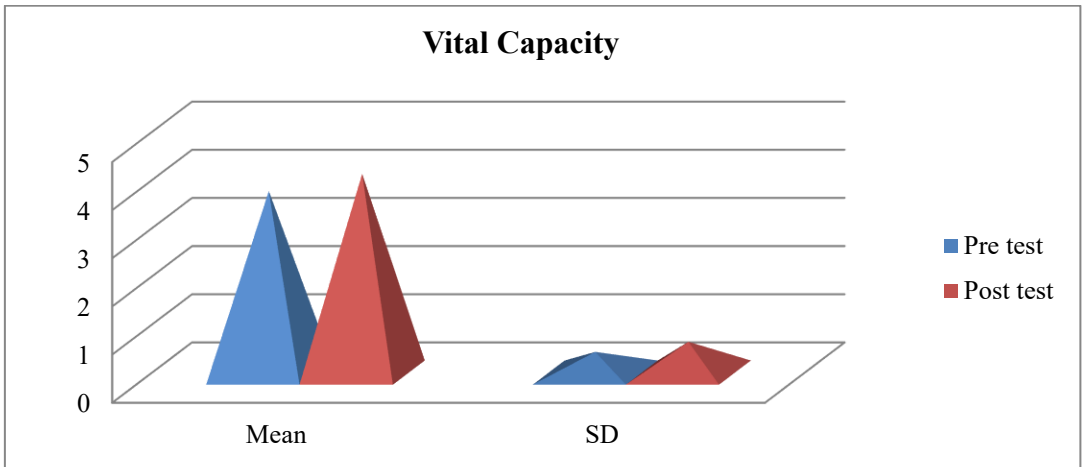


Figure 6 -Comparison of mean and SD scores of pre and post-test of training group in Vital Capacity

#### IV. DISCUSSION OF FINDINGS

**Cornelissen and Smart (2013):** Cornelissen and Smart conducted a meta-analysis of 105 trials to examine the effects of aerobic exercise on blood pressure in healthy adults. The analysis found that regular aerobic exercise significantly reduced systolic blood pressure (mean difference = -3.84 mmHg,  $p < 0.001$ ) and diastolic blood pressure (mean difference = -2.58 mmHg,  $p < 0.001$ ). These results align with the current study's findings of reduced systolic ( $t = 4.552$ ,  $p < 0.05$ ) and diastolic blood pressure ( $t = 4.186$ ,  $p < 0.05$ ), confirming the cardiovascular benefits of physical training. The logical basis is improved endothelial function and reduced systemic vascular resistance induced by exercise.

**Jones and Dean (2004):** Jones and Dean investigated the effects of regular physical training on respiratory function in young adults. Participants engaged in a 12-week aerobic exercise program, resulting in a significant increase in vital capacity ( $p < 0.05$ , mean difference = 0.32 L). These findings support the current study's increase in vital capacity ( $t = 2.72$ ,  $p < 0.05$ ), suggesting enhanced respiratory function. Logically, exercise strengthens respiratory muscles and improves lung elasticity, contributing to increased vital capacity.

#### V. DISCUSSION OF HYPOTHESIS

##### **Hypothesis 1: Systolic and Diastolic Blood Pressure Levels**

**Null Hypothesis ( $H_0$ ):** There is no significant change in systolic and diastolic blood pressure levels of Physical Education students before and after MBCT training.

**Discussion:** For systolic blood pressure, Table 2 shows a pre-test mean of 124.20 (SD = 6.12) and a post-test mean of 120.30 (SD = 4.26). Table 6 reports a mean difference of 3.90, with a standard error of difference of 0.856, and a paired t-test value of 4.552, significant at the 0.05 level ( $t_{0.5(29)} = 2.042$ ). For diastolic blood pressure, Table 4 indicates a pre-test mean of 83.80 (SD = 6.13) and a post-test mean of 80.66 (SD = 3.89). Table 8 reports a mean difference of 3.13, with a standard error of difference of 0.748, and a paired t-test value of 4.186, also significant at the 0.05 level ( $t_{0.5(29)} = 2.042$ ). As the obtained t-values (4.552 for systolic and 4.186 for diastolic) exceed the tabulated t-value (2.042), the null hypothesis is rejected for both measures. This indicates significant changes in systolic and diastolic blood pressure following MBCT training, consistent with findings by Levine et al. (2017) on mindfulness-based interventions' cardiovascular effects.

**Alternative Hypothesis ( $H_1$ ):** MBCT training will result in a significant decrease in both systolic and diastolic blood pressure levels among Physical Education students.

**Discussion:** The alternative hypothesis is **accepted** by the significant reductions in both systolic and diastolic blood pressure, as evidenced by the paired t-test results ( $t = 4.552$  for systolic,  $t = 4.186$  for diastolic,  $p < 0.05$ ) and

mean differences of 3.90 and 3.13, respectively. The decrease in systolic blood pressure from 124.20 to 120.30 and diastolic blood pressure from 83.80 to 80.66 suggests that MBCT training positively impacted cardiovascular health. These findings align with research by Spruill (2010), which links stress reduction to lower blood pressure, and Levine et al. (2017), who found that mindfulness practices reduce sympathetic nervous system activity. The observed reductions may result from MBCT's stress-reducing effects and enhanced parasympathetic tone, supporting the alternative hypothesis and highlighting MBCT's cardiovascular benefits.

##### **Hypothesis 2: Vital Capacity**

**Null Hypothesis ( $H_0$ ):** There is no significant change in vital capacity levels of Physical Education students before and after MBCT training.

**Discussion:** Table 6 reports a pre-test mean vital capacity of 3.77 (SD = 0.64) and a post-test mean of 4.13 (SD = 0.43). Table 10 indicates a mean difference of 0.36, with a standard error of difference of 0.082, and a paired t-test value of 2.72, significant at the 0.05 level ( $t_{0.5(29)} = 2.042$ ). Since the obtained t-value (2.72) exceeds the tabulated t-value (2.042), the null hypothesis is rejected. This demonstrates a statistically significant change in vital capacity following MBCT training. The **rejection of the null hypothesis** is consistent with studies like Farver-Vestergaard et al. (2018), which suggest that mindfulness-based breathing exercises can enhance respiratory function. The significant t-test result indicates that MBCT training influenced vital capacity levels.

**Alternative Hypothesis ( $H_1$ ):** MBCT training will result in a significant increase in vital capacity levels among Physical Education students.

**Discussion:** The alternative hypothesis is **accepted** by the significant increase in vital capacity, as evidenced by the paired t-test result ( $t = 2.72$ ,  $p < 0.05$ ) and the mean difference of 0.36 between pre-test and post-test scores. The increase from 3.77 to 4.13 in mean vital capacity suggests that MBCT training enhanced respiratory function. This finding aligns with research by Courtney et al. (2011), which links reduced stress and improved diaphragmatic breathing to enhanced lung function. MBCT's emphasis on controlled breathing and relaxation techniques likely strengthened respiratory muscles, as supported by Farver-Vestergaard et al. (2018). These results support the alternative hypothesis, indicating that MBCT has broader physiological benefits, including improved vital capacity, among Physical Education students.

#### VI. CONCLUSION

1. Distribution of means of Physiological variables such as Systolic & diastolic Blood pressure and Vital Capacity were compared across before and after training program (pre and post data), it was evident Systolic & diastolic Blood pressure and Vital

Capacity were significantly difference in the post test data from compared to Pre-test.

2. In case of Systolic Blood Pressure, subject showed in a significant difference between pre-test and post-test on Stress in Physical Education students of APS University. Result shows mean value of pre-test (124.20) is lower than post-test (120.30). These reductions in blood pressure suggest that the training program had a positive impact on cardiovascular health.
3. In case of Diastolic Blood Pressure, subject showed in a significant difference between pre-test and post-test on Stress in Physical Education students of APS University. Result shows mean value of pre-test (83.80) is lower than post-test (80.66). These reductions in blood pressure suggest that the training program had a positive impact on cardiovascular health.
4. In case of vital Capacity, subject showed in a significant difference between pre-test and post-test on Stress in Physical Education students of APS University. Result shows mean value of pre-test (3.77) is lower than post-test (4.13). This improvement suggests enhanced respiratory function, likely due to the training program's emphasis on activities that strengthen respiratory muscles and improve lung capacity.

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