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Effect of Therapeutic Lifestyle Changes (TLC) In Patients with Systemic Hypertension

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Abstract

Introduction: Prehypertension is a growing public health concern, often progressing to full-blown hypertension if not addressed early. Therapeutic Lifestyle Changes (TLC), including yoga, offer promising non-pharmacological strategies for prevention and management.

Methods: This true experimental study involved 110 prehypertensive participants aged 18–65 years, randomly assigned to experimental (yoga) and control (no intervention) groups. The experimental group practiced yoga daily for 1 to 1.5 hours over six months. Blood pressure readings were taken biweekly. Statistical analysis included repeated measures ANOVA and ANCOVA to assess the impact of the intervention.

Results: Baseline systolic and diastolic blood pressures were similar across groups. Over six months, the experimental group showed a significant reduction in systolic BP (from 132 mmHg to 127 mmHg) and diastolic BP (from 84 mmHg to 82 mmHg), while the control group showed no meaningful change. No significant associations were found between blood pressure and demographic or lifestyle variables, except smoking, which was linked to elevated diastolic pressure.

Discussion: Yoga was found to be an effective, accessible intervention for reducing blood pressure in individuals with prehypertension. These findings support the inclusion of TLC, particularly yoga, in routine care strategies for early-stage hypertension management.

Conclusion: Yoga effectively reduces systolic and diastolic blood pressure in prehypertensive individuals, with significant improvements seen only in the experimental group. Smoking was the only notable risk factor for elevated diastolic pressure. The findings support yoga as a valuable lifestyle intervention to manage and prevent prehypertension.

Key words: Pre-hypertension, TLC, Yoga, Hypertension, non pharmacological intervention

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Introduction:

Pre-hypertension is one of the most common conditions affecting the human being worldwide. It is not treated earlier its give several complications including hypertension. Pre- hypertension means the blood pressure is between normal and hypertension given by the Seventh Report Joint National Committee (JNC-7) classification.

According to cardiology clinic statistics, in the united states approximately 3 of 8 adults were having prehypertension the blood pressure range of 120 to 139/80 to 89 mm Hg and roughly 1 in 8 adults were having high normal BP or stage 2 prehypertension blood pressure range of 130 to 139/85 to 89 mm Hg, and also they are having greater risk to suffer cardiovascular disease. [8]

Prehypertension is a warning to individuals with resting blood pressures between 120/80 mmHg and 139/89 mmHg of an insidious progression of blood pressure towards hypertensive levels (140/90 mmHg). Prehypertension is associated with increased cardiovascular risk and end organ damage compared individuals with normotensive. Elucidating all of the factors associated with a rise in resting blood pressure and comparing the effects of medication versus lifestyle changes may aid the clinician in developing a preventive and/or treatment strategy for each individual[1].

About 1 in 5 adults is unaware of having high blood pressure and would not report having it. Hypertension is projected to increase about 8 percent between 2013 and 2030[2].

Objectives:

1. To assess the pre-test and post tests systolic and diastolic blood pressure of pre hypertensive patients in experimental and control group.
2. To compare the Mean pre test and Mean post-tests systolic and diastolic blood pressure score of pre hypertensive patients in experimental and control group.
3. To evaluate the effectiveness of Therapeutic Lifestyle Changes (TLC) i.e. yoga on blood pressure among patients with Pre hypertension.
4. To find out the association between levels of blood pressure (systolic & diastolic) and selected demographic variables of pre-hypertensive patients.

Methodology

A true experimental time-series pre-test post-test design was employed to assess the effectiveness of yoga on systolic and diastolic blood pressure among patients with prehypertension. The study was conducted between November 2013 and January 2015 at three selected sites in Mangalore: Aviskar Yoga Center, Patanjali Yoga Academy, and the outpatient department of K.S. Hegde Medical Academy.

A total of 110 participants aged between 18 and 65 years, with systolic blood pressure ranging from 120–139 mmHg and diastolic pressure between 80–89 mmHg, were enrolled based on specific inclusion and exclusion criteria. Subjects with serious cardiac conditions, comorbidities, mobility impairments, or those already on antihypertensive medications were excluded. The sampling process consisted of two phases: purposive sampling for initial recruitment followed by random allocation into experimental (n=55) and control (n=55) groups using a coin flip method.

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The experimental group received a structured yoga intervention, which included asanas and pranayama tailored for blood pressure control. Participants were trained by certified instructors and asked to practice daily for one to one and a half hours over a six-month period. The control group did not receive any intervention. A yoga manual detailing the techniques and duration of practice was provided.

Blood pressure was assessed every 15 days using a calibrated sphygmomanometer and stethoscope, employing the in vivo bio-physiological method. Data collection instruments included a semi-structured interview schedule to gather demographic, clinical, and behavioral information. Content validity was ensured through expert review by nine professionals, and instrument reliability was confirmed with a coefficient of 0.97.

Results and Analysis

The following section presents the detailed findings from the study, organized into baseline characteristics, intervention outcomes, and statistical analyses. Descriptive statistics were used to outline participant demographics, ensuring comparability between the experimental and control groups at the outset. The primary objective was to evaluate the effectiveness of yoga as a therapeutic lifestyle intervention in reducing systolic and diastolic blood pressure among prehypertensive individuals. Inferential statistics, including ANOVA and ANCOVA, were applied to assess the impact of the intervention across multiple time points. Additionally, associations between blood pressure levels and selected demographic and lifestyle variables were explored.

Demographic and Baseline Characteristics

Descriptive statistics were used to analyze socio-demographic data of prehypertensive patients. Participants in both the experimental and control groups were comparable at baseline. The average systolic blood pressure was 132 mmHg and diastolic pressure was 84 mmHg for the experimental group, while the control group had 132 mmHg and 85 mmHg, respectively. A Student's t-test confirmed no significant difference between the two groups before intervention.

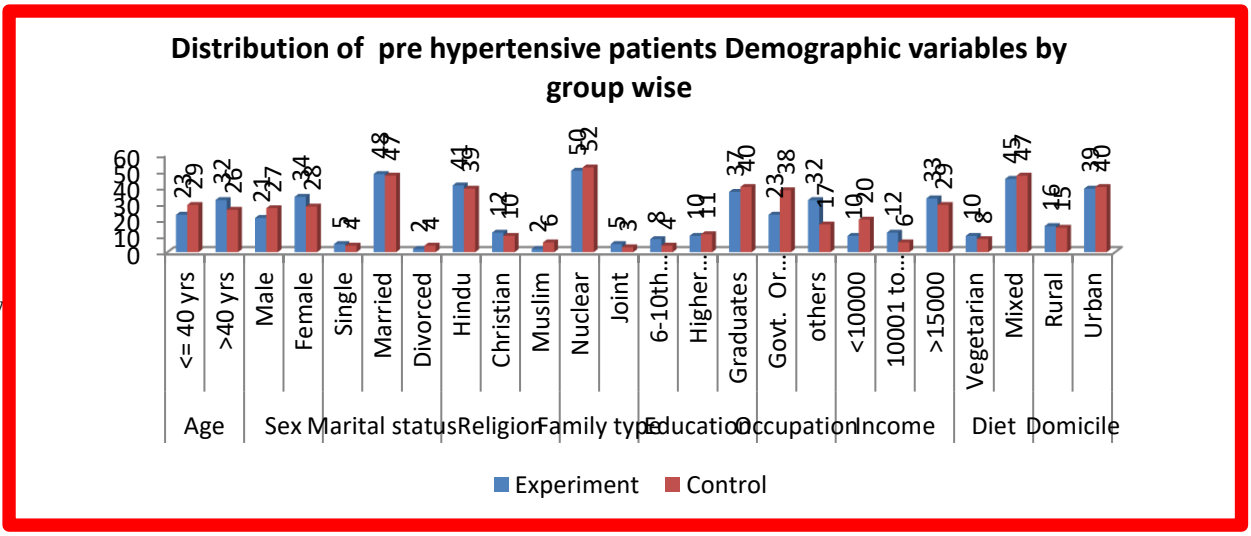

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Figure 1: Bar diagram shows the Distribution of pre-hypertensive patient's demographic variables by group wise

Effectiveness of Yoga on Blood Pressure

Systolic Blood Pressure

Repeated measures ANOVA (2x10 design) was applied to evaluate changes in systolic blood pressure. A gradual reduction in systolic BP in the experimental group from 132 mmHg to 127 mmHg over six months. This reduction was statistically significant ($p<0.001$). Repeated contrast tests further confirmed the consistent effectiveness of yoga across all time points.

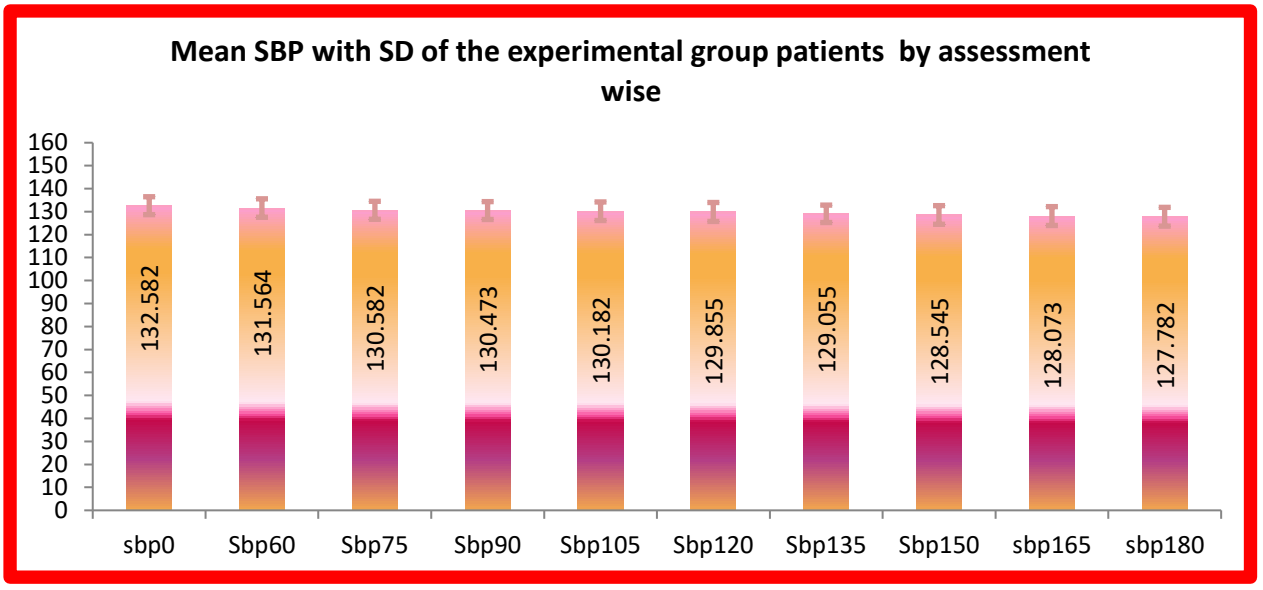

Fig 2: Error plot diagram shows the Mean systolic blood pressure of the experimental group by assessment-wise

The control group experienced no significant change in systolic BP, with slight increases noted over time.

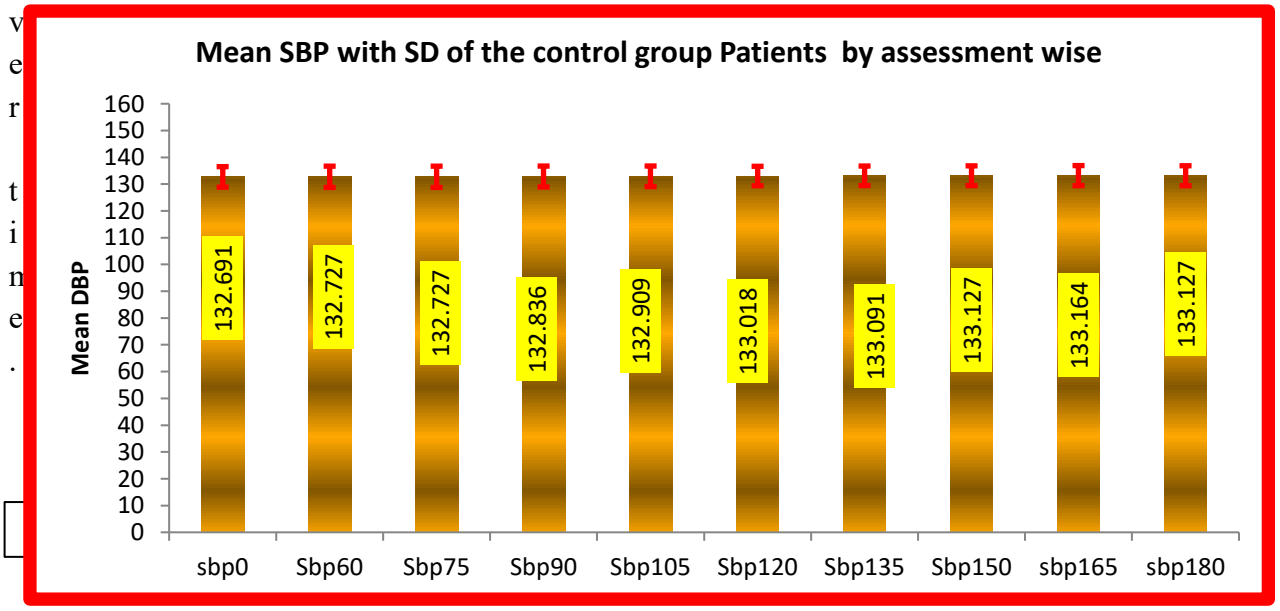

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Fig 3: Error plot diagram shows the Mean systolic blood pressure of the control group by assessment-wise

A comparative line diagram, reaffirming that the experimental group's improvements were due to the yoga intervention.

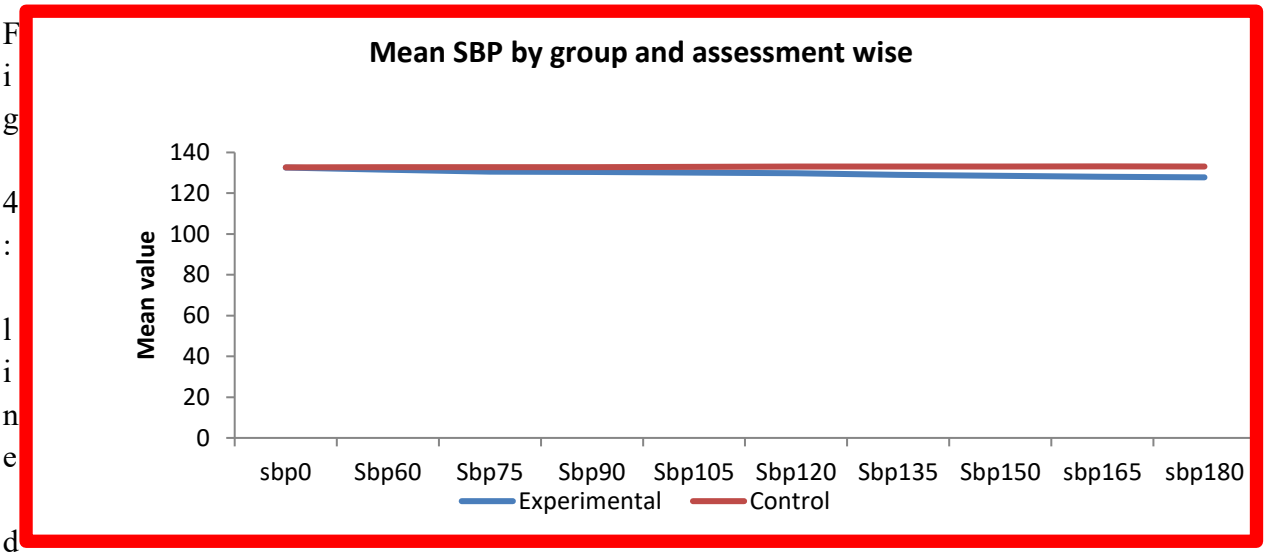

Fig 4: line diagram shows the Mean systolic blood pressure of the experimental and control group by group wise and assessment wise.

Diastolic Blood Pressure

A reduction in diastolic BP from 84 mmHg to 82 mmHg in the experimental group, statistically validated through repeated measures ANOVA ($p<0.001$).

A clear divergence in diastolic blood pressure trends between the experimental and control groups over the six-month period, with the experimental group showing a consistent decline and the control group maintaining or slightly increasing their values.

A 2x10 ANOVA and ANCOVA revealed significant reductions in systolic and diastolic blood pressure in the experimental group ($p<0.001$). No significant changes were observed in the control group. Only smoking showed a significant association with elevated diastolic pressure; other demographic variables had no impact.

Association with Demographic and Health Variables

Systolic blood pressure showed no significant association with demographic, hypertension-related, or lifestyle variables. However, smoking was significantly associated with elevated diastolic pressure. All other variables, including age, gender, income, diet, and physical activity, had no statistical impact on blood pressure outcomes.

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Kruskal-Wallis analysis indicated no significant associations between diastolic BP and demographic or hypertension-related variables. However, a significant association was found between smoking and elevated diastolic BP, suggesting that smoking may influence diastolic pressure independently of other factors.

Discussion

Demographically, most patients were over 40, female, married, Hindu, and urban residents with graduate-level education. A significant proportion had family histories of hypertension, mixed diets, and sedentary habits. These findings offer insight into common profiles among prehypertensive patients.

Yoga significantly reduced both systolic and diastolic blood pressure among the experimental group over six months. The absence of changes in the control group reinforces the intervention's effectiveness. Findings align with prior research, such as a study presented at the American Society of Hypertension, where yoga led to measurable BP reductions in patients with prehypertension and Stage 1 hypertension.

Regarding associations, most demographic and lifestyle factors showed no statistically significant link with BP changes, except for smoking, which correlated with elevated diastolic pressure. This supports findings from a study on Chinese nonagenarians, which reported higher diastolic BP in heavy smokers.

Conclusion

The analysis confirms that yoga is an effective non-pharmacological intervention for reducing systolic and diastolic blood pressure in prehypertensive patients. The study observed clear improvements in the experimental group, whereas the control group showed no significant changes. While most demographic and behavioral variables were not associated with BP levels, smoking emerged as a notable risk factor for elevated diastolic pressure. These findings reinforce the importance of lifestyle modifications, including yoga, in managing prehypertension and preventing hypertension progression.

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