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Effect of Six Eye Exercises Protocol on Oculomotor Control, Anxiety and Emotional Intelligence in Hypertensive Subjects - A Randomized Clinical Trial

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Abstract

Background - Hypertension has a larger impact on the various systems of the body along with poor quality of life. After a span of almost one year, alteration in the oculomotor movements can be seen which is a lesser-known fact. Research suggests that there is correlation of between oculomotor movements which is going to cause anxiety prevailing emotional distress. This association is linked with elevation of BP , hampering daily activities as well as work calibre. To address all these issues, currently there are various interventions for hypertensive patients at surgical, medical and advanced level but there is a lack of study on the community level. This highlights the need for a patient friendly approach which will focus on these specific concerns. the need of this study is to create a community friendly intervention for hypertensive patients whose oculomotor movements are affected due to which anxiety and emotional intelligence may get impaired. This study will give a secondary pathway to manage all these symptoms in a very convenient way. Six Eye Exercise protocol being a completely patient friendly protocol will not only allow the patient to perform it with ease but will also create a community friendly approach of treating the above issues.

Aim: To study the Effect of six eye exercise protocol on oculomotor control, anxiety and emotional intelligence in hypertensive subjects.

Methodology:30 subjects will be assessed before and after the 4-week treatment. Pre and Post Interventional assessments are- Hamilton Anxiety Rating Scale that will be used to asses anxiety; VOMS (Vestibular occulomotor screening) for assessing occulomotor function; Emotional Intelligence Questionnaire for assessing emotional intelligence. Subjects receive 1:1 30 min treatment, 5 days a week for 4 weeks.

Outcome measures: Hamilton anxiety rating scale, vestibulo oculomotor screening, emotional intelligence questionnaire.

Result: effective increase in emotional intelligence, oculomotor functions and effective decrease in anxiety levels in hypertensive subjects post six eye exercise protocol

Conclusion: here we conclude that six eye exercise protocol increase emotional intelligence and oculomotor movements and decrease anxiety in hypertensive subjects.

Keywords: Hypertension, Oculomotor Control, Anxiety, Emotional Intelligence, six eye exercises protocol

Introduction

Hypertension can be defined as a rise in blood pressure of unknown cause that increases risk of cerebral ,cardiac and renal events.[1]Individuals are either normal or hypertensive based on their cardiovascular status .The progression of hypertension from early to advanced may be represented as stage 1,2,3 hypertension. Each stage of hypertension is characterized by the cumulative presence or absence of markers of hypertensive cardiovascular diseases and evidence of target audience damage regardless of blood pressure level[2] Hypertension causes alterations in artery structure and function that can impair blood flow, particularly during an ischemic insult or during of low arterial pressure.[3]Patients with non-dipper hypertension had significantly higher depression and anxiety scores compared to patients with dipper hypertension . This would help to detect non-dipper group and hence guide for better management.[4]

Hypertension was associated with OSA during REM sleep. REM OSA may need consideration as an important clinical entity requiring treatment.OSA and reduced REM sleep time are associated with increased odds of having RHT.[6]

REM sleep is also characterized by a reduction in the hypoxic and hypercapnic ventilatory drive. These physiologic phenomena may in part explain why obstructive apneas and hypopneas during REM sleep are longer in duration, associated with significantly greater oxygen desaturation, and lead to greater fluctuations in BP compared with obstructive events in non-REM sleep.[7]

Men and women with hypertension have higher prevalence of musculoskeletal complaint,which was no longer significant in women's after adjustment of age, education, diabetes mellitus,skin colour,body mass index, physical inactivity, alcohol, smoking,or history of cardiovascular diseases .[9&10]

Generalised Osteoarthritis was found to be significantly more comman in older males with high diastolic blood pressure Osteoarthritis of knee in female was more frequent in hypertensive groups independent of obesity. [8]

Recent evidence suggests that a circumventricular organ in brain stem, the area postrema, is also involved in the mediation of several forms of experimental hypertension. In renin-and nonrenin-dependent forms of renal hypertension, two major factors activate central mechanisms. First, direct central actions of angiotensin, acting through receptors in the subfornical organ and organum vasculosum of the lamina terminalis, increase sympathetic discharge and secretion of vasopressin through mechanisms integrated at the level of the AV3V region. Second, sensory systems originating in the kidney can activate increased sympathetic discharge through complex projection pathways involving forebrain systems.[11]

Hypertension Is one of the strongest risk factors for almost all different cardiovascular diseases acquired during life, including coronary disease,left ventricular hypertrophy,valvular heart disease, cardiac arrhythmias including atrial fibrillation, cerebral stroke and renal failure.[12]

Reasearch support increased risk of hypertension in individuals eho are uindergoing social and family stress, working over 10 hours a day and who record mild to moderate levels of anxiety and depression at evaluation tests.

The meam emotional intelligence score of hypertension subjects was 96.68 and that of normal subjects was 126.68. Therefore, it is concluded that the emotional intelligence if hypertensive subjects is significantly lower than normal healthy subjects. this indicates that indicates that emotional well-being has significant effect on hypertensive patients.[5]

GRADE1: SBP- 140-159mmHg and/or DBP- 90-99mmHg

GRADE2: SBP- 160-179 mmHg and/or DBP- 100-109mmHg

GRADE3: SBP- >/=180mmHg and/or DBP >/=110mmHg

Methodology and Materials

Methodology

Study design: Experimental Study
Study Type: Randomized Clinical Trial
Study duration: 6 months
Sample size: 30
Sample population: Hypertensive Subjects
Sampling Method: Purposive Sampling
Study setting: Tertiary Health care Centers ,Miraj

Materials

chair
measure tape
metronome
target with 14 point font print

Outcome Measures

Hamilton anxiety rating scale
Vestibulo oculomotor screening
Emotional intelligence questionaire

INTERVENTION

SIX EYE EXERCISES PROTOCOL

Eye Stretches:

instructions: “look at the center. Now look to the right. Keep your eyes to the right, look straight up, now straight down, look back to centre.look to the left , keeping your eyes to the left, look straight up, now straight down.” Expected findings: no restriction of eye motion

Tracking (Smooth Pursuits):

Procedure:pencil with coloured ball (eg.push pin)on top held vertically 14-16 inches from eyes.move pencil slowly in the following directions: If the client moves head on first attempt, repeat with instructions to keep head still. Instructions: "Follow the colored ball on the end of this pencil." Expected findings: Smooth movement with both eyes maintaining Gaze on target throughout all movements. No loss of target, Jerkiness of motion, or under- or overshooting of target. No movement of head.

Gaze stabilization: Procedure: Sit facing the client at eye level. Using a slow arc-like motion, bring a pencil, held horizontally, from above and below, and, held vertically, in from both sides, moving from the unseen field (behind the patient) around to the seen field. Next, bring the pencil in from Halfway between each of the horizontal and Vertical motions for a total of 8 test points. Instructions: "Keep looking at my nose. I am going to Bring a pencil in from above (below, behind) you. Tell me when you first see the pencil." Expected findings: Identifi cation of pencil (not colored ball) at 110° for side, 65° for above, 70° for below, with corresponding angles for the midpoint motions

Spatial localization:

Procedure: Give the client a pencil to hold with the unsharpened End facing down. Hold a second unsharpened pencil vertically In front of the client with the unsharpened End facing up. One attempt only. Instructions: "Hold this pencil at shoulder level when I say 'Go,' bring your pencil up and over as quickly as you can and touch the end of your pencil to the end of my pencil. Go." Expected findings: Quick, direct motion resulting in contact of pencil ends

Saccades:

Procedure: Hold two pencils with colored balls (push pins) of two different colors vertically 14–16 inches from eyes and 8 inches apart from each other. Using an uneven rhythm, ask the client to look at one target and then the other for a total of 5 sets (10 total).

Instructions: "Look at the (one color) ball. Now, the (other color) ball, etc."

Expected findings: Quick, accurate eye movement to target for fi ve sets. No under- or overshooting of target. No movement of head.

Vergence:

Procedure: Hold a pencil vertically, 16 inches from eyes with ball (push pin) on top. Slowly move ball in at eye level (from below if wearing bifocals) and between the two eyes. After report of double and/or blur (or 2 inches from bridge of nose), bring the pencil back out.Instructions: "I'm going to move the pencil Toward you. Tell me when you see two balls Or a blurry ball. " Bringing the target back out, "Tell me when it looks single and clear again."

Expected findings: Both eyes looking directly at target throughout. Report of double or blur (break point) at 2–4 inches from bridge of nose. Recovery of single at 4–6 inches After completing their respective 4-wk protocols, each participant was retested on all procedure and secondary outcome measures according to the pretesting procedure .Participants received 30 min of additional 1:1 vision treatment, according to their group assignment, 5 days per week for 4 weeks.[18]

Statistical Analysis

Data will be statistically analyzed by-

Normality test using Shapiro-Wilk
Comparison of pre-test and post-test for VOMS by paired sample Wilcoxon test
Comparison of pre-test and post-test EI-Q by paired sample Wilcoxon test
Comparison of pre-test and post-test for HARS by paired sample Wilcoxon test
Pre and post intervention will be done by paired t test

Results

Normality test using Shapiro-Wilk

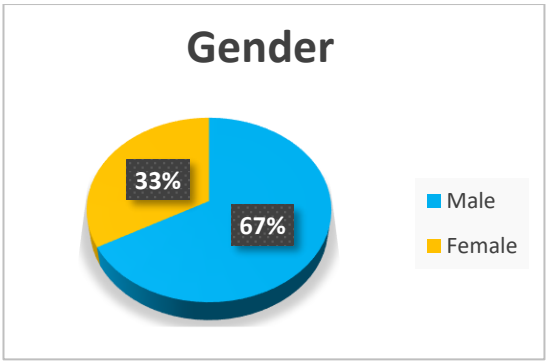
Table 1

Variable	Time frame	z-value	p-value
VOMS	Pre	0.866	0.001
	Post	0.916	0.021
EI-Q	Pre	0.867	0.001
	Post	0.907	0.012
HARS	Pre	0.953	0.199
	Post	0.913	0.018

Shapiro wilk test can be used to decide whether or not a sample fits a normal distribution the Z value is the number of standard deviation units away from the mean, and the area is the probability of observing a value less than that particular Z value A p-value is a statistical measurement used to validate a hypothesis against observed data. A p-value measures the probability of obtaining the observed results, assuming that the null hypothesis is true. The lower the p-value, the greater the statistical significance of the observed difference

Table 2

Gender	Frequency	Percent
Male	20	67
Female	10	33
Total	30	100

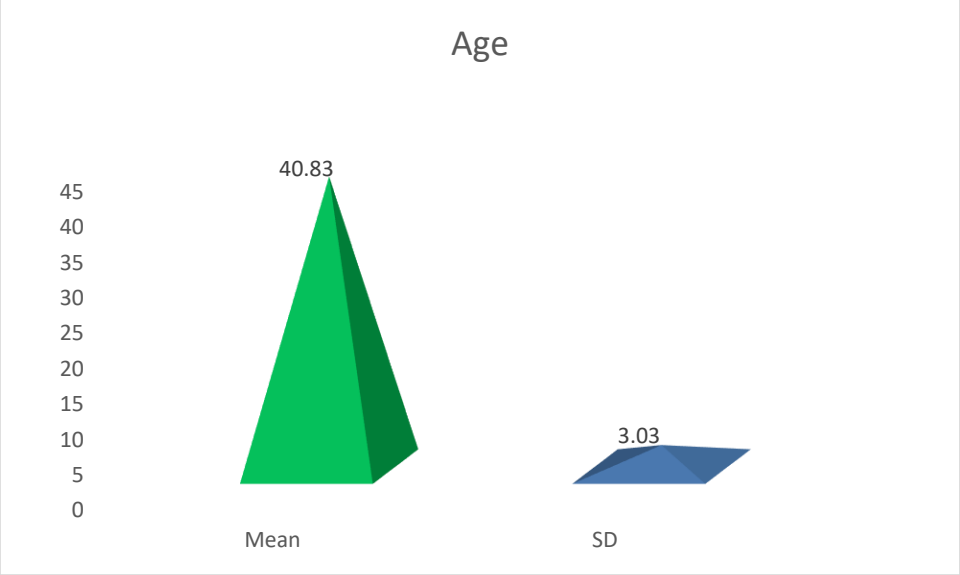


Frequency is the number of occurrences of a repeating event per unit of time.
Percent is a number or ratio expressed as a fraction of 100.

Descriptive Statistics

Table 3

Variables	Minimum	Maximum	Mean	SD
Age	36	45	40.83	3.03



Minimum is the smallest amount or level that is possible or allowed.
Maximum is the greatest amount or level of something that is possible or allowed.
The mean absolute difference is a measure of statistical dispersion equal to the average absolute difference of two independent values drawn from a probability distribution the standard deviation is a measure of the amount of variation or dispersion of a set of values. A low standard deviation indicates that the values tend to be close to the mean of the set, while a high standard deviation indicates that the values are spread out over a wider range

Pre and post test

Comparison of pre-test and post-test for VOMS by paired sample Wilcoxon test

Table 4

Times	Mean	SD	Mean Diff.	SD Diff.	Effect size	z-value	p-value
Pre-test	7.37	1.45	2.57	0.90	2.86	4.843	0.001*
Post-test	4.80	1.45					

The Wilcoxon test is used to compare two dependent, independent or to conduct a paired difference test of repeated measurements on a single sample to assess whether their population mean ranks differ. Mean is the average of the given numbers and is calculated by dividing the sum of given numbers by the total number of numbers. The mean absolute difference is a measure of statistical dispersion equal to the average absolute difference of two independent values drawn from a probability distribution Sd difference is Low standard deviation means data are clustered around the mean, and high standard deviation indicates data are more spread out an effect size is a value measuring the strength of the relationship between two variables in a population, or a sample-based estimate of that quantity the Z value is the number of standard

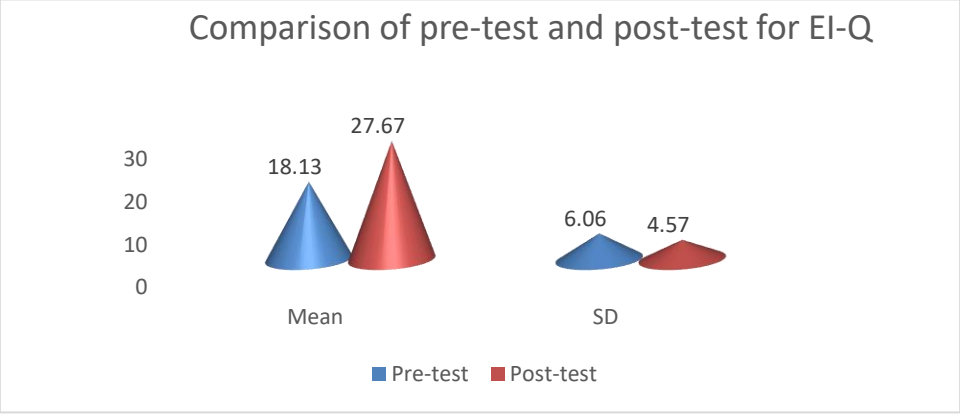
deviation units away from the mean, and the area is the probability of observing a value less than that particular Z value A p-value is a statistical measurement used to validate a hypothesis against observed data. A p-value measures the probability of obtaining the observed results, assuming that the null hypothesis is true. The lower the p-value, the greater the statistical significance of the observed difference The Voms mean value indicated changes post treatment and lower values are recorded for post treatment outcome and Based on the results of the test analysis at 5% significance level, there is a significant statistical reliable difference between the pre & post treatment values with p-value is less than the 5% significance level (i.e. 0.001 < 0.05) in the study and therefore it justifies the improvements in health outcome post intervention.

Comparison of pre-test and post-test EI-Q by paired sample Wilcoxon test

Table 5

Times	Mean	SD	Mean Diff.	SD Diff.	Effect size	z-value	p-value
Pre-test	18.13	6.06	9.53	4.72	2.02	4.785	0.001*
Post-test	27.67	4.57					

The EI-Q mean value indicated changes post treatment and higher values are recorded for post treatment outcome and also the standard deviation shows the consistency with post treatment value which is less than pre value.Based on the results of the test analysis at 5% significance level, there is a significant statistical reliable difference between the pre & post treatment values with p-value is less than the 5% significance level (i.e. 0.001 < 0.05) in the study and therefore it justifies the improvements in health outcome post intervention

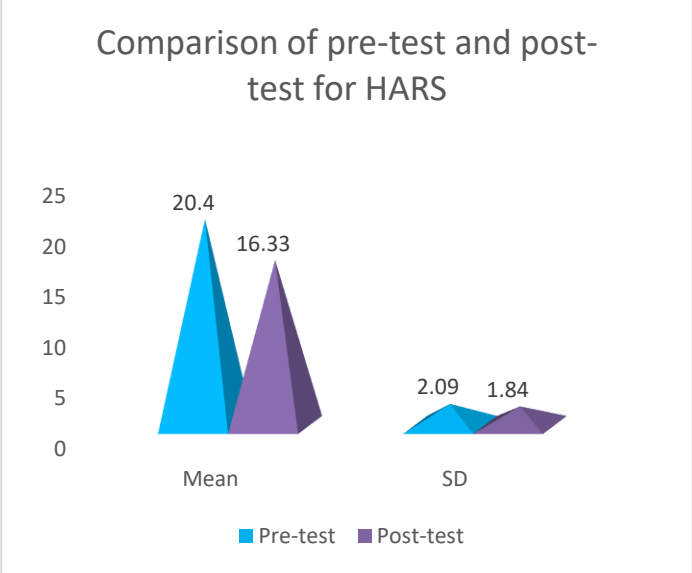


Comparison of pre-test and post-test for HARS by paired sample Wilcoxon test

Times	Mean	SD	Mean Diff.	SD Diff.	Effect size	z-value	p-value
Pre-test	20.40	2.09	4.07	1.48	2.74	4.829	0.001*
Post-test	16.33	1.84					

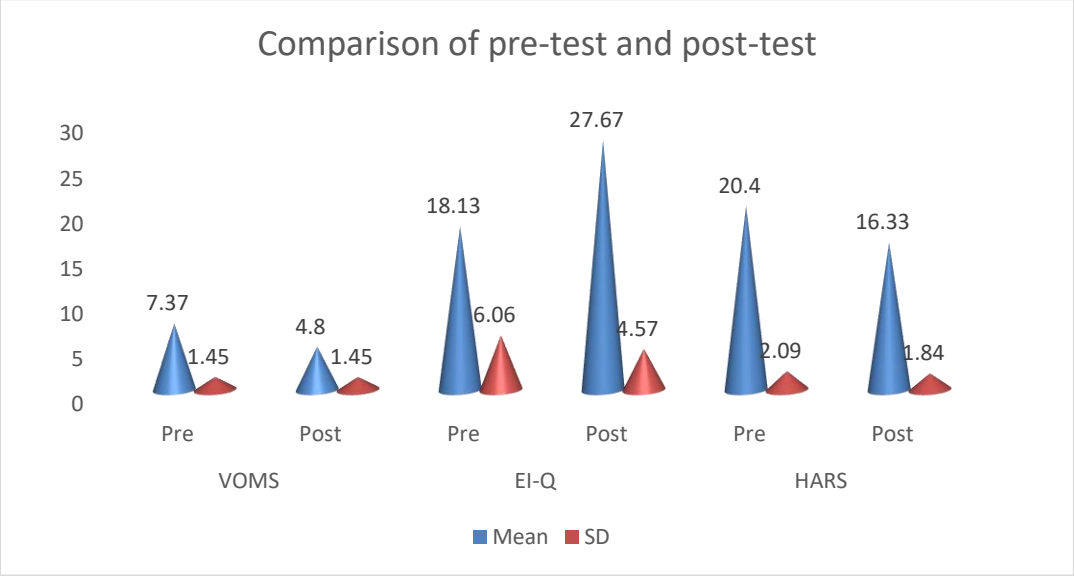
Table 6

The HARS mean value indicated changes post treatment and lower values are recorded for post treatment outcome and also the standard deviation shows the consistency with post treatment value which is less than pre value.Based on the results of the test analysis at 5% significance level, there is a significant statistical reliable difference between the pre & post treatment values with p-value is less than the 5% significance level (i.e. 0.001 < 0.05) in the study and therefore it justifies the improvements in health outcome post intervention



Variable	Times	Mean	SD	Mean Diff.	SD Diff.	Effect size	z-value	p-value
VOMS	Pre	7.37	1.45	2.57	0.90	2.86	4.843	0.001*
	Post	4.80	1.45					
EI-Q	Pre	18.13	6.06	9.53	4.72	2.02	4.785	0.001*
	Post	27.67	4.57					
HARS	Pre	20.40	2.09	4.07	1.48	2.74	4.829	0.001*
	Post	16.33	1.84					

Table 7



Discussion

This study investigated hypertensive patients pre and post six eyes exercise protocol using Hamilton anxiety rating scale, emotional intelligence questionnaire and vestibulo oculomotor screening. Individuals are either normal or hypertensive based on their cardiovascular status .The progression of hypertension from early to advanced may be represented as stage 1,2,3 hypertension. Each stage of hypertension is characterized by the cumulative presence or absence of markers of hypertensive cardiovascular diseases and evidence of target audience damage regardless of blood pressure levels. Hypertension causes alterations in artery structure and function that can impair blood flow, particularly during an ischemic insult or during of low arterial pressure. Patients with non- dipper hypertension had significantly higher depression and anxiety scores compared to patients with dipper hypertension .This would help to detect non-dipper group and hence guide for better management-Hypertension was associated with obstructive sleep apnea during rapid eye movement sleep. REM OSA may need consideration as an important clinical entity requiring treatment .OSA and reduced REM sleep time are associated with increased odds of having resistant hypertension-REM sleep is also characterized by a reduction in the hypoxic and hypercapnic ventilatory drive. These physiologic phenomena may in part explain why obstructive apneas and hypopneas during REM sleep are longer in duration, associated with significantly greater oxygen desaturation, and lead to greater fluctuations in BP compared with obstructive events in non-REM sleep Men and women with hypertension have higher prevalence of musculoskeletal complaint ,which was no longer significant in women's after adjustment of age, education, diabetes mellitus ,skin color, body mass index, physical inactivity, alcohol, smoking ,or history of cardiovascular diseases Generalized Osteoarthritis was found to be significantly more common in older males with high diastolic blood pressure Osteoarthritis of knee in female was more frequent in hypertensive groups independent of obesity Recent evidence suggests that a circumventricular organ in brain stem, the area postrema, is also involved in the mediation of several forms of experimental hypertension. In renin-and nonrenin-dependent forms of renal hypertension, two major factors activate central mechanisms. First, direct central actions of angiotensin, acting through receptors in the subfornical organ and organum vasculosum of the lamina terminalis, increase sympathetic discharge and secretion of vasopressin through mechanisms integrated at the level of the AV3V region. Second, sensory systems originating in the kidney can activate increased

sympathetic discharge through complex projection pathways involving forebrain systems.Hypertension Is one of the strongest risk factors for almost all different cardiovascular diseases acquired during life, including coronary disease,left ventricular hypertrophy,valvular heart disease, cardiac arrhythmias including atrial fibrillation, cerebral stroke and renal failure[Reasearch support increased risk of hypertension in individuals eho are uindergoing social and family stress, working over 10 hours a day and who record mild to moderate levels of anxiety and depression at evaluation tests.

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Hypertension has a larger impact on the various systems of the body along with poor quality of life.After a span of almost one year, alteration in the oculomotor movements can be seen which is a lesser known fact . Research suggests that there is correlation between oculomotor movements which is going to cause anxiety prevailing emotional distress. This association is linked with elevation of BP, hampering daily activities as well as work calibre. To address all these issues, currently there are various interventions for hypertensive patients at surgical , medical and advanced level but there is a lack of study on community level . This highlights the need for a patient friendly approach which will focus on these specific concerns.

There is a need to create a community friendly intervention for hypertensive patients whose oculomotor movements are affected due to which anxiety and emotional intelligence may get impaired. This study will give a secondary pathway to manage all these symptoms in a very convenient way. Six Eye Exercise protocol being a completely patient friendly protocol will not only allow the patient to perform it with ease but will also create a community friendly approach of treating the above issues.
Hence, it is concluded that six eyes protocol is effective in betterment of anxiety, emotional intelligence and oculomotor movements.

Conclusion

According to the findings the result of the study concludes that there is significant improvement in anxiety ,emotional intelligence ,oculomotor movements in hypertensive subjects.

Appendix

INFORMED CONSENT FORM

Participant's Name : _____

Age/ Gender : _____

Address :

_____

Title of the project : ' EFFECT OF SIX EYE EXERCISE PROTOCOL ON OCULOMOTOR CONTROL, ANXIETY AND EMOTIONAL INTELLIGENCE IN HYPERTENSIVE SUBJECTS-A RANDOMIZED CLINICAL TRIAL.

The details of the study have been provided to me in writing and explained to me in my own language. I confirmed that I have understood the above study and have the opportunity to ask question. I understand that my participation in the study is voluntary and that I am free to withdraw at any time without giving any reasons. By doing so I am aware that my medical care or legal rights will not be affected. I agree that the data or results obtained from this study can be used only for scientific purpose(s). I fully agree to participate in the above study.

Signature of the guide: Signature of the investigator

:_____ _____

Date Place

Acknowledgement

I take this wonderful opportunity to thank all the "HANDS" which have joined together to make this project a SUCCESS.

It's my great pleasure and privilege to express my deep-felt gratitude to our respected Principal **Dr. Aakansha Joshi** and Guide **Dr. Vrushali Bhore** who immensely helped me and rendered their advice, precious time, constant encouragement, knowledge and relevant information regarding my study, and whose suggestion and guidance has enlightened me on this subject. I express my sincere thanks to **all the teaching & nonteaching staff** of the Miraj Medical Centre, College of Physiotherapy. I would also thank the medical students for willingly accepting to be part of this project and sparing their precious time for it. I would like to thank my parents for their blessings, love, constant support, affection and encouragement.

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