

**COMBINED AND ISOLATED EFFECT OF YOGA AND RESISTANCE TRAINING
ON SELECTED PHYSICAL PHYSIOLOGICAL AND PSYCHOLOGICAL
VARIABLES AMONG POSTPARTUM WOMEN**

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IN
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CERTIFICATE BY THE SUPERVISOR

This is to certify that the dissertation entitled “**COMBINED AND ISOLATED EFFECTS OF YOGA AND RESISTANCE TRAINING ON SELECTED PHYSICAL, PHYSIOLOGICAL AND PSYCHOLOGICAL VARIABLES AMONG POSTPARTUM WOMEN**” is a record of research work done by **Y. PAVANYA BALAJI**, a part time scholar of Doctor of Philosophy in Physical Education, Tamil Nadu Physical Education and Sports University, Chennai during the year 2015- 2020.

This dissertation is her original work and it has not previously formed the basis for the award to any candidate, for any degree, diploma, associateship or other similar titles. This dissertation represents, entirely an independent work on the part of the candidate but for the general guidance by me.

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DECLARATION BY THE RESEARCH SCHOLAR

I, **Y. PAVANYA BALAJI**, research scholar of Doctor of Philosophy in Physical Education hereby declare that the dissertation entitled “**COMBINED AND ISOLATED EFFECTS OF YOGA AND RESISTANCE TRAINING ON SELECTED PHYSICAL, PHYSIOLOGICAL AND PSYCHOLOGICAL VARIABLES AMONG POSTPARTUM WOMEN**” submitted to Tamil Nadu Physical Education and Sports University for the award of Doctor of Philosophy in Physical Education is my original work and it has not previously formed the basis for the award of any degree, diploma, associateship, fellowship or any other similar titles to any candidate of any University.

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Research Scholar

**DEDICATED TO
MY PARENTS, HUSBAND,
SISTERS, SON LAAHIT
AND
FAMILY MEMBERS**

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TABLE OF CONTENTS		Page NO
Certificate by the Supervisor		ii
Declaration by the Scholar		iii
Dedication		iv
Acknowledgement		vi
List of Tables		xii
List of Illustration		xiv
List of Appendices		xv
List of Reprint		xvi
		Page NO
CHAPTER - I	INTRODUCTION	1-37
1.1	Postpartum Period	1
1.2	Physical Exercise and Postpartum	2
1.3	Postpartum Status in India	3
1.4	Problems During the Postpartum Stage	4
1.5	Benefits of Postpartum Exercise	5
1.6	Yoga	6
1.7	Meaning of Yoga	8
1.8	The Origin of Yoga	8
1.9	Innovation of Yoga and its Development	9
1.10	Vedic Period	9
1.11	Classical Period	10
1.12	Post Classical Period	10
1.13	Eight Petals of Yoga	10
1.14	Asanas	11
1.14.1	Benefits of Yoga	12
1.14.2	Physical Benefits	12
1.14.3	Physiological Benefits	12
1.14.4	Psychological Benefits	13
1.15	Benefits of Yoga for Postpartum Women	13
1.16	Resistance Training	16
1.16.1	Importance of Resistance Training	17
1.16.2	Benefits of Resistance Training	17
1.17	Effect of Training on Different Variables	19
1.17.1	Flexibility	19
1.17.2	Body Composition	20
1.17.3	Body Mass Index	21
1.17.4	Blood Pressure	22
1.17.5	Systolic Blood Pressure	22
1.17.6	Diastolic Blood Pressure	22
1.17.7	Importance of Systolic and Diastolic Blood Pressure	23
1.17.8	Vital Capacity	23

Table of Content Continued....

1.17.9	Breath Holding Time	24
1.17.10	Mood State	24
1.17.11	Tension	25
1.17.12	Depression	26
1.17.13	Anger	27
1.17.14	Vigour	28
1.17.15	Fatigue	28
1.17.16	Confusion	29
1.18	Need of the Study	30
1.19	Objectives of the Study	31
1.20	Statement of the Problem	32
1.21	Significance of the Problem	32
1.22	Hypotheses	33
1.23	Delimitations	33
1.23.1	Dependent Variables	33
1.23.2	Independent Variables	34
1.24	Limitations	34
1.25	Definition of the Important Terms	35
1.25.1	Yoga	35
1.25.2	Asana	35
1.25.3	Resistance Training	35
1.25.4	Flexibility	35
1.25.5	Body Mass Index	35
1.25.6	Mean Arterial Blood Pressure	36
1.25.7	Forced Vital Capacity	36
1.25.8	Breath Holding Time	36
1.25.9	Mood State	36
1.25.10	Tension – Anxiety (T)	36
1.25.11	Depression – Dejection (D)	37
1.28.12	Anger – Hostility (A)	37
1.25.13	Vigour – Activity (V)	37
1.25.14	Fatigue – Inertia (F)	37
1.25.15	Confusion – Bewilderment (C)	37
CHAPTER-II REVIEW OF RELATED LITERATURE		38-69
2.1	Studies on the Effect of Yoga on Postpartum Women	38
2.2	Studies on Different forms of Physical Exercises on Postpartum women	51
2.3	Summary of Related Literature	69

Table of Content Continued....

CHAPTER-III	METHODOLOGY	70-96
3.1	Selection of Subjects	70
3.2	Selection of Variables	70
3.2.1	Dependent Variables	71
3.2.2	Independent Variables	71
3.3	Experimental Design	71
3.4	Pilot Study	72
3.5	Criterion Measures	72
3.6	Reliability of Data	73
3.6.1	Tester's Competency	73
3.6.2	Subject's Reliability	74
3.6.3	Reliability of Equipments	75
3.7	Training Programmes	75
3.7.1	Training Schedule for Isolated Yogic Practices	75
3.8	Training Schedule for Isolated Resistance Training	77
3.9	Training Programme for Combined Training	78
3.10	Description of Yogic Practices and resistance exercises	80
3.11	Test Administration	89
3.10.1	Flexibility (Sit and Reach Test)	89
3.10.2	Body Mass Index	90
3.10.3	Mean Arterial Blood Pressure	91
3.10.4	Breath Holding Time	92
3.10.5	Forced Vital Capacity	93
3.10.6	Mood State	93
3.11	Collection of Data	94
3.12	Statistical Procedure	95
3.13	Flow Chart Showing the Methodology	96
CHAPTER - IV	RESULT AND DISCUSSIONS	97-153
4.1	Overview	97
4.2	Test of Significance	97
4.3	Level of Significance	98
4.4	Computation of Analysis of Covariance of Flexibility	99
4.4.1	Results of Flexibility	99
4.4.2	Discussion on the Findings of Flexibility	103
4.5	Computation of Analysis of Covariance of Body Mass Index	104

Table of Content Continued....

4.5.1	Results of Body Mass Index	104
4.5.2	Discussion on the Findings of Body Mass Index	107
4.6	Computation of Analysis of Covariance of Mean Arterial Blood Pressure	108
4.6.1	Results of Mean Arterial Blood Pressure	108
4.6.2	Discussion on the Findings of Mean Arterial Blood Pressure	112
4.7	Computation of Analysis of Covariance of Forced Vital Capacity	113
4.7.1	Results of Forced Vital Capacity	113
4.7.2	Discussion on the Findings of Forced Vital Capacity	117
4.8	Computation of Analysis of Covariance of Breath Holding Time	118
4.8.1	Results of Breath Holding Time	118
4.8.2	Discussion on the Findings of Breath Holding Time	122
4.9	Computation of Analysis of Covariance of Tension	123
4.9.1	Results of Tension	123
4.9.2	Discussion on the Findings of Tension	127
4.10	Computation of Analysis of Covariance of Depression	128
4.10.1	Results of Depression	128
4.10.2	Discussion on the Findings of Depression	132
4.11	Computation of Analysis of Covariance of Anger	133
4.11.1	Results of Anger	133
4.11.2	Discussion on the Findings of Anger	137
4.12	Computation of Analysis of Covariance of Vigour	138
4.12.1	Results of Vigour	138
4.12.2	Discussion on the Findings of Vigour	142
4.13	Computation of Analysis of Covariance of Fatigue	143
4.13.1	Results of Fatigue	143
4.13.2	Discussion on the Findings of Fatigue	147
4.14	Computation of Analysis of Covariance of Confusion	148
4.14.1	Results of Confusion	148
4.14.2	Discussion on the Findings of Confusion	152
4.15	Discussion on Hypotheses	153
CHAPTER - V	SUMMARY, CONCLUSIONS AND RECOMMENDATIONS	155-160
5.1	Summary	155
5.2	Conclusion	158
5.3	Recommendations	159

Table of Content Continued....

5.4	Suggestions for Further Research	159
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BIBLIOGRAPHY **161-168**

Books	161
Journals	162
Published Dissertation	167
Web Sites	167

Table NO.	LIST OF TABLES	Page NO.
I	Selected Criterion Variables, Tests / Tools Administered and the Unit of Measurement	73
II	Intra Class Correlation Coefficient of Test – Retest Scores	74
III	Description of Training Schedule for Isolated Yogic Practices for I to II & III to IV Weeks	76A
IV	Description of Training Schedule for Isolated Yogic Practices for V to VI & VII to VIII Weeks	76B
V	Description of Training Schedule for Isolated Resistance Training for I to II Weeks	77A
VI	Description of Training Schedule for Isolated Resistance Training for III to IV Weeks, V to VI weeks	77B
VII	Description of Training Schedule for Isolated Resistance Training for VII to VIII Weeks	78
VIII	Description of Training Schedule for Combined Training – Isolated Yogic Practices and Isolated Resistance Training I to II Weeks	78
IX	Description of Training Schedule for Combined Training – Isolated Yogic Practices and Isolated Resistance Training III to IV weeks, V to VI weeks and VI to VIII Weeks	79
X	Computation of Analysis of Covariance on Flexibility	99
XI	Computation of Scheffe’s Post Hoc Test Ordered Adjusted Final Mean Difference of Flexibility	100
XII	Computation of Analysis of Covariance on Body Mass Index	104
XIII	Computation of Analysis of Covariance on Mean Arterial Blood Pressure	108
XIV	Computation of Scheffe’s Post Hoc Test Ordered Adjusted Final Mean Difference of Mean Arterial Blood Pressure	109
XV	Computation of Analysis of Covariance on Forced Vital capacity	113
XVI	Computation of Scheffe’s Post Hoc Test Ordered Adjusted Final Mean Difference of Forced Vital Capacity	114
XVII	Computation of Analysis of Covariance on Breath Holding Time	118
XVIII	Computation of Scheffe’s Post Hoc Test Ordered Adjusted Final Mean Difference of Breath Holding Time	119
XIX	Computation of Analysis of Covariance on Tension	123

Figure NO	LIST OF ILLUSTRATIONS	Page NO
1	Bar Diagram Showing the Pre, Post and Adjusted Post Test Means of Flexibility	102
2	Bar Diagram Showing the Pre, Post and Adjusted Post Test Means of Body Mass Index	106
3	Bar Diagram Showing the Pre, Post and Adjusted Post Test Means of Mean Arterial Blood Pressure	111
4	Bar Diagram Showing the Pre, Post and Adjusted Post Test Means of Forced Vital Capacity	116
5	Bar Diagram Showing the Pre, Post and Adjusted Post Test Means of Breath Holding Time	121
6	Bar Diagram Showing the Pre, Post and Adjusted Post Test Means of Tension	126
7	Bar Diagram Showing the Pre, Post and Adjusted Post Test Means of Depression	131
8	Bar Diagram Showing the Pre, Post and Adjusted Post Test Means of Anger	136
9	Bar Diagram Showing the Pre, Post and Adjusted Post Test Means of Vigour	141
10	Bar Diagram Showing the Pre, Post and Adjusted Post Test Means of Fatigue	146
11	Bar Diagram Showing the Pre, Post and Adjusted Post Test Means of Confusion	151

Appendix NO	APPENDICES	Page NO
A	Consent to Participate Voluntarily in Research Investigation	169
B	Raw Scores on Flexibility	170
C	Raw Scores on Body Mass Index	171
D	Raw Scores on Mean Arterial Blood Pressure	172
E	Raw Scores on Forced Vital Capacity	173
F	Raw Scores on Breath Holding Time	174
G	Raw Scores on Tension	175
H	Raw Scores on Depression	176
I	Raw Scores on Anger	177
J	Raw Scores on Vigour	178
K	Raw Scores on Fatigue	179
L	Raw Scores on Confusion	180
M	Questionnaire to Assess Mood	181

Reprint NO	LIST OF REPRINT	Page NO
A	Effect of Yogic Practices on Selected Physiological Variables Among Postpartum Women	182
B	Effect of resistance training on selected psychological variables among postpartum women	188

CHAPTER - I

INTRODUCTION

Motherhood is a divine emotion, an incomparable feeling. A mother shares the most beautiful and strongest bond with her child. It makes her the happiest person on the earth; however, this happiness comes with a responsibility.

Mothers are potentially susceptible to some complications, postpartum which would affect their wellbeing. So, it is essential to deliver appropriate postpartum care, to improve physical, mental and social wellbeing **(Bahadoran, et al., 2007)**. Pregnancy and delivery would help a woman achieve physical and mental self-actualization. No other phenomena could have such overwhelming effect on physical, emotional and social aspects of her life **(Pilliteri, 2003)**. Mothers, experience many physiological, mental and social changes at postpartum period, which deserve more attention **(Matesson, 2001)**. They are susceptible to some disorders and complications, such as fatigue and weakness, anorexia, insomnia, urinary incontinence, constipation, postpartum blues, and depression **(Cunningham Williams, 2005; Lowdermilk, 2003)**.

1.1 POSTPARTUM PERIOD

The postpartum period is the interval between the birth of the newborn and the return of the maternal reproductive organs to their normal pre-pregnant state. Physiological and anatomical alterations develop in many organ systems during the postpartum period. This period is sometimes referred to as the puerperium. Although the puerperium has traditionally been considered as lasting 6 weeks, this time frame varies among women. The distinct physiologic changes that occur during the reversal According to modern view, puerperium is the period of 45 days following child birth during which the body tissues specially the pelvic organs revert back approximately to

the pre-pregnant state both anatomically and physiologically of the processes of pregnancy are normal. Postpartum period is associated with intense physical and emotional and social changes leading to anxiety and mood disturbances (**Pratima Maurya, 2016**).

The postpartum care starts just after delivery and would be continued to the end of puerperium stage, which would be 6 to 8 weeks after delivery. In this period, the mother should be supported physically and emotionally and take evaluations in this regard (**Bennett, Brown Myles, 1999**). According to the WHO definitions, physical, mental and social wellbeing are the three aspects of life quality. It is essentially a concept that originates from the responses of a person to the physical, mental and social factors (**Draper, 1997**). It is evident that delivering proper care to improve the health and life quality of mothers is a must; that needs a regular, evidence-based program for postpartum care (**Pilliteri, 2003**).

1.2 PHYSICAL EXERCISE AND POSTPARTUM

One of the actions that could influence health and life quality of mothers is to encourage them to take physical exercises at postpartum period (**Lowdermilk and Perry, 2003**). Exercise is an important factor to maintain physical wellbeing, and consequently the mental wellbeing. It reduces the emotional stresses and improves the self confidence. Meanwhile, it improves the quality of nutrition and sleep, fortifies the muscles and bones and prevents osteoporosis (**Sampselle, et al., 1999**). In addition, taking regular physical exercise is an effective therapy for clinical depression, as well as its positive role in improvement of mental and social health in healthy people (**Cunningham Williams, 2005**). Taking aerobic exercises 6 to 8 weeks postpartum, 4 to 5 times per week, would be a key factor in maintaining the normal and maximum muscle function. A complete exercise program in this period, prevents some future

problems such as pelvic floor muscles dysfunction, inappropriate posture, gastric and bowel motility decrease, shoulder and low back pain, fatigue, breastfeeding problems, and impaired self image (**Draper, 1997**).

Women that take physical exercise at postpartum period enjoy advantages such as less weight retention, and higher delivery adjustment scores. Regarding the useful effects of exercise for general population, it is expected to have good effects at postpartum period, as well (**Sampselle, et al., 1999**). Women are not familiar with postpartum physical exercises. Some of these mothers complain of some postpartum complications, such as fatigue and weakness, sleeping disorders, constipation, and blues and also are unsatisfied with their appearance. It is commonly believed that postpartum exercise decreases weight retention and women take more physical exercise before pregnancy than during and after pregnancy. In addition, family of the woman and her husband are the most effective factors on taking exercise during and after pregnancy (**Downs and Hausenblas, 2004**). Women's health and status are crucial for the well being of the family and communities. In any community mother and children constitute priority group in population (**park and Park, 1985**).

1.3 POSTPARTUM STATUS IN INDIA

The WHO in 2017 found that approximately 1 in 5 new mothers in India suffers from postpartum depression. The seriousness of this mental ailment has not been fully realized due to a myriad of factors including outdated cultural practices, illiteracy and ignorance of health experts. The physical and emotional changes that happen to a woman during pregnancy and after childbirth bring about a unique type of depression related to the whole situation. A large percentage of women in India are not aware of this particular physical and mental issue and will assume it as part of

being a new parent. The problem is that postpartum depression can become a serious physical and mental problem for a mother, sometimes leading to self-harm.

In India, women of the child bearing age 15-44 years constitute 22 per cent and children under 15 years of age constitute about 42 per cent of the total population, together they constitute nearly 65 per cent of the total population, so providing care to the mother and children is important to save the mother. “Pregnancy is special, let’s make it safe” is the theme of world health organization observed on 7th April 1998 under the slogan of safe motherhood. Safe motherhood is a women’s ability to have a safe and healthy pregnancy and delivery (**Nagaseshamma, 2013**).

1.4 PROBLEMS DURING THE POSTPARTUM STAGE

For women of reproductive age, excessive gestational weight gain and/or postpartum weight retention can significantly increase the risk of obesity. The risk of becoming overweight or obese is even greater when excessive gestational weight gain and/or postpartum weight retention occurs in successive pregnancies (**Schmitt, et al., 2007**). During pregnancy, obesity and excessive weight gain are associated with adverse maternal and fetal outcomes. Furthermore, an increase in BMI between subsequent pregnancies increases the risk of pre-eclampsia, gestational hypertension, C-section delivery, stillbirth and delivering a large for gestational age neonate even if a woman has a ‘normal’ BMI for both pregnancies (**Villamor, 2006**). By one year postpartum 14 to 20% of women retain 5 kg or more of weight gained during pregnancy, which elevates the risk of developing health problems, such as diabetes, metabolic syndrome and cardiovascular disease 7. For most women pregnancy and the postpartum period are generally associated with a reduction in the level of physical activity. It is assumed that in combination with poor dietary choices/habits, a

lack of physical activity and an increase in sedentary behavior have an important role in the development of overweight and obesity (**WHO, 2009**).

The postpartum period is a critical transition time, return to a physically active lifestyle, balanced diet, and a gradual shedding of extra weight can be challenging. For some women, the challenges of motherhood manifest themselves in physical and mental symptoms. Fatigue, frequently compounded by sleep disturbance, is common and present in nearly two thirds of women 12 months after delivery. The lack of vigor associated with fatigue, newborn sleep and feeding schedules, and the strain of balancing other family duties and work schedules can be overwhelming and can negatively affect mom's ability/desire to exercise consistently. In some women, these factors lead to significant levels of depression.

1.5 BENEFITS OF POSTPARTUM EXERCISE

The benefits of postpartum exercise may be masked in lactating women because both exercise and lactation can alter metabolism, food intake, and psychosocial well-being. The exercise is accentuating fatigue. Prolonged rest/physical inactivity actually contributes to fatigue, promotes increased body weight and decreased vigor and mental acuity and increases the risk of developing future chronic health conditions. An emerging body of evidence indicates that exercise in the postpartum period:

- Reduces fatigue and increases vigor
- Improves mood states and mental acuity
- Improves fitness
- Promotes return to prepregnancy weight
- Decreases the risk for developing future chronic health conditions
- Provides important mom time and social interactions

- Improve the cardiovascular fitness
- Strengthen and tone abdominal muscles
- Reduce symptoms of postpartum depression
- Relieve stress
- Promote better sleep
- Reduce tension

There are numerous benefits to being physically active after pregnancy. All women are encouraged to begin exercising as soon as medically appropriate and to remain physically active throughout their lifetimes.

In this context, the main aim of this study was to evaluate the physical condition of a group of postpartum women with 35 years old using the physical, physiological and psychological variables to test combined and isolated effect of yoga and resistance training.

1.6 YOGA

Yoga is the “Union of the individual self with universal self (**Iyengar, 2001**). Yoga means the union or communication or unity with our inner being. Asana means a state of being in which remain steady clam, quiet and comfortable with our physical, body and mental.

The word Yoga is derived from the Sanskrit root Yuj. The meaning is to bind, join, and attach and yoke, to direct and concentrate one’s attention on, to use and apply. It also means union or communion. It means the disciplining of the mind, intellect, the emotions, the will, which yoga presupposes, it means a poise of the soul which enables one to look at life in all its aspects evenly (**Iyengar, 2001**).

Yoga is one of the six orthodox systems of Indian philosophy. It was coordinated and systematized by Patanjali in his classical work, the Yoga Sutras,

which consists of 195 terse aphorisms in which it is stated that yoga is a state where all activities of the mind are channalized in one direction or the mind is free from distractions (**Iyengar, 2006**).

Yoga is a science by which the individual approaches truth. The aim of all yoga practice is to achieve truth where the individual soul identifies itself with the supreme soul. Yoga has the surest remedies for physical as well as psychological ailments. It makes the organs of the body active in their functioning and has good effect on internal functioning of the human body. Yoga is a re education of mental process, along with the physical.

Yoga has been practiced in India for over two millennia. Stories and legends from ancient times testify to the existence of yoga and to the practitioners and divinities associated with it. India literature is a storehouse of knowledge about yoga covering every conversing conceivable level. Roughly in chronological order are the vocals (books of scriptural knowledge), the Upanishada (Philosophical cosmologies), and their commentaries; then the Puranas (ancient cosmologies), and the two epics, the Ramayana and the Mahabharatha. The Mahabharatha contains within itself that master piece of Indian scripture the Bagawad Gita. Towards the end of Vedic period comes the aphoristic literature, with the “yoga Aphorisms” of Patanjali of special interest to yoga students. Besides, whole bodies of works both ancient (Pre-Christian) and more modern with various aspects of yoga and yoga philosophy, testifying to the continued relevance of yoga as a discipline (**Andre Van Lysebeth, (1987)**).

In other systems of physical exercises, the internal organs of the body mostly do not get proper exercises, while yogic practices gives sufficient exercises to the internal organs of the body. Yoga practices have a greater impact on the mind and control the senses. Yogic practices make possible not only physical and mental

development but also intellectual and spiritual development. Yoga practices are called a ‘non-violent activity’ (**Chandrasekaran.K (2003)**).

1.7 MEANING OF YOGA

The literal meaning of the word yoga is yoke. It means for uniting the individual spirit with the universal spirit or God. The word yoga is derived from the roots of Sanskrit ‘Yuj’ which means to join, to attach, to bind, and yoke and to concentrate on attention (**Chandrasekaran, 2003**).

Mahadev Desai, (1972) says in his introduction to the Gita and according to Gandhi, the yoking of all the powers of body, the mind, the emotion, the will which the yoga presupposes, it means pose of the soul which enables one to look at life in all its aspect evenly. In Indian culture or thought human beings or everyone on this earth is guided by the supreme universal spirit, i.e., Pramatma or God of which the individual human spirit, i.e., Jivatma is a part. Yoga is a way to secure liberation (Moksha) because it is the means by which the jivatma can be united to the pramatma.

The science of yoga works on physical, mental, emotional, psychic and spiritual aspects of a person. When imbalance is experienced at this level, the organs, and muscles and nerves no longer function in harmony, rather than opposition to each other. Therefore yoga aims at bringing the different body functions into perfect co-ordination so that they work for the God of the whole body.

Yoga has a complete message for humanity. It is a message for the human body, human mind and human soul (**Iyengar, 1986**).

1.8 THE ORIGIN OF YOGA

In the modern era, the origin of yoga is not usually given much importance. While ‘yoga’ has now become a veritable household word, knowledge of its roots escapes most people, even many of those practising it with regularity. “Historically

yoga was more than a particular teaching. Yoga, a way of life, a culture and a lifestyle which encompassed not just techniques, practices or ideas, but also eating habits, bathing habits, prayer, social interaction, and work. Yoga included a vast body of 'attitudes toward being', an ingrained sense of morality and ethic and it was the bedrock of the personal - social - cosmic order which developed in that part of the earth known as India. Therefore it is in the ancient Samskrithi (culture) of Bharata that origin of yoga is to be found."- Smt. Meenakshi Devi Bhavanani, "Returning to the Roots; Classical Yoga".

1.9 INNOVATION OF YOGA AND ITS DEVELOPMENT

Although it wasn't until recently when yoga earned massive recognition and gained a huge following, it has existed for the past thousands of years. The earliest written scriptures that would help trace the origins of yoga were found in the Indus Valley during an archaeological excavation. Hence, it could be very well that yoga started out during this early antique period. Yoga also been associated by many to Stone Age Shamanism, although there is no valid link between the two except for the fact that having a few similarities in their method and approach. However, most modern yoga methods are still deeply rooted to the Indian philosophy, which provides this practice with its religious and spiritual aspect. Ever since yoga was introduced, it has seen varied evolution. In the east, yoga remains to be a sacred practice that incorporates a lot of prayer and chanting into each session. But in the Western parts of the world, yoga has been used mainly for its physical exercises that are known to provide health and fitness benefits.

1.10 VEDIC PERIOD

This period represents the existence of the Vedas, which is a sacred scripture used by modern day practice of Hinduism. These scriptures collect various hymns that

praise a divine power. All of the activities involved aims to go beyond the limitations of the mind and in the process allow the physical body to do things it is normally incapable of doing.

1.11 CLASSICAL PERIOD

This time period represents the creation of the Yoga Sutra, authored by Patanjali during the 2nd century. Patanjali's writings will pave the way for the standardization of the Classical Yoga that now serves as the basis for the practice and philosophies of Raja Yoga. At this point, the eight limbs of yoga were established as follows: yama or social restraints, niyama or personal observance of discipline, asanas or physical postures, pranayama or proper breathing control, pratyahara or sense withdrawal, dharana or concentration, dhyana or meditation, and samadhi or Self realization.

1.12 POST CLASSICAL PERIOD

Now that Panjatali was able to establish the eight-limbed paths toward the ultimate goal of practicing yoga, this period witnesses the gradual spread of yoga and its teachings. This was evident not only in practice, but also in the growth of literature dedicated to the proliferation of the teachings and principles of yoga. One of the major focus of the practice of yoga during this time period is the focus on the present moment. It also resulted to the formation of the five principles of yoga, which are proper relaxation, proper exercise, proper breathing, proper diet, and proper meditation.

1.13 EIGHT PETALS OF YOGA

- Yama (social disciplines)
- Niyama (individual disciplines)
- Asana (posture)

- Pranayama (regulation of breathing)
- Prathyahara (withdrawal of senses)
- Dharana (concentration)
- Dhyana (meditation)
- Samadhi (knowing directly higher self)

1.14 ASANAS

Asanas are an integral part of yoga. Nowadays yoga is understood as asanas or physical postures. However asanas were implied as physical postures in which one can comfortably sit and practice higher practices of yoga like pranayama, dharana and dhyana. Patanjali defines asanas as, “sthiraasukhamasana” It implies any meditative posture which is stable (sthira), and comfortable (sukham). Its main purpose is to calm the mind. A steady and pleasant posture produces mental balance and prevents uncertainty of mind. The word asana is derived from the Sanskrit verb ‘Aas’ which means existence and state of existence is Asana or Position. Here the position of Body as well as Mind is expected in Asana.

The similar description of asana is found in Hatha Yoga Pradipika which says that “One can achieve sound health, stability, lightness of body and mind with asana”. In Gheranda Samhita (Another text on Hatha Yoga), the author describes the effect of asana as “Perfecting the stability of body and mind is the result of asana”.

Yoga is the universal religion, a way of life, which is above all castes, creeds, languages, regions and nations. Yoga consists of eight parts, namely, Yama, Niyama, Asana, Pranayama, Pratyahara, Dharana, Dhyana and Samadhi. All these put together stands for Yoga. There are various types of yoga, some of them are - Karma Yoga, Jnana Yoga, Hata Yoga, Raj Yoga, Mantra Yoga, Laya Yoga, Bhakti Yoga etc.

1.14.1 BENEFITS OF YOGA

Yoga is a science that has been practiced for thousands of years. The benefits are grouped into three categories such as physical benefits, psychological benefits, physiological benefits and biochemical effects. This is based on the regular practice of traditional asana, pranayama and meditation (**Swami Sivananda, 2002**)

1.14.2 PHYSICAL BENEFITS

- Stable autonomic nervous system equilibrium
- Pulse rate decreases
- Respiratory rate decreases
- Blood Pressure decreases
- Galvanic Skin Response (GSR) increases
- Cardiovascular efficiency increases
- Respiratory efficiency increases
- Grip strength increases
- Eye-hand coordination improves
- Dexterity skills improve
- Reaction time improves

1.14.3 PHYSIOLOGICAL BENEFITS

- Glucose decreases
- Total cholesterol decreases
- Triglycerides decrease
- HDL cholesterol increases
- LDL cholesterol decreases
- VLDL cholesterol decreases
- Cholinesterase increases

- Catecholamines decrease
- ATPase increases
- Hematocrit increases
- Hemoglobin increases
- Lymphocyte count increases
- Total white blood cell count decreases
- Thyroxin increases
- Vitamin C increases
- Total serum protein increases

1.14.4 PSYCHOLOGICAL BENEFITS

- Mood improves and subjective well-being increases
- Anxiety and Depression decrease
- Hostility decreases
- Concentration improves
- Memory improves
- Attention improves
- Learning efficiency improves
- Mood status improves
- Self-actualization increase
- Social skills increases
- Well-being increases

1.15 BENEFITS OF YOGA FOR POSTPARTUM WOMEN

Yoga is beneficial, especially after giving birth. It affects the body and hormones. For most mothers, they find yoga to be the only way for them to find a

sense of calm. It helps to focus on the present while it clears their mind. It sorts the aches and pains.

Some new mothers tend to experience morning sickness. It can be the result of their hormones. These are the worst parts she does not want to experience after giving birth. Practice breathing exercises, reducing the ache and nausea. The yoga regularly, sickness and back pain would improve. It helps achieve calmness. Yoga practices involve a lot of breathing exercises. Whether it's a deep or slow breathing, it can help immensely in everyday life. Learning how to breathe deep is improving the core abdominal muscles so as to allow more oxygen into the body. Being a new mother can be scary, especially first time and spouse to support. But with the help of yoga poses, learn how to be calm in all aspects of life.

Yoga strengthens the woman's body. The reason for this is that this form of exercise gives women a real stretch. After pregnancy, the energy levels might still be fluctuating. With yoga, she can now feel alive and let stay in shape, stretching exercises. Increasing body flexibility and thereby strengthening it. To attend a regular yoga class for prenatal and postnatal yoga class. The social aspect of it gives her a safe and supportive space as she cater to postpregnancy needs.

Although it takes time to get into pre-natal body, achieve it with patience and practice. Apart from relieving stress is also focusing on breathing. It targets the entire core while tighten abs and strengthen lower back. For some health experts, yoga is a perfect, complete workout without having to strain to the body. It lets move throughout the day allowing the energy in taking care of her baby.

While one is pregnant, the belly grew and changed causing a shift in the center of gravity. To walk upright, there has to be a balance between lower back muscles and

abdominal muscles. The abdominal muscles are weak, they can cause the lower back to work more, resulting in pain and strain in that area.

After pregnancy, the lower back and abdominal muscles would be stretched as to carry the newborn and take care of other household chores. Works on abdominal muscles through yoga is keeping them active. It also brings the belly to spine, thereby, bringing back the abs that before pregnancy. With stronger muscles would have better posture.

As mentioned earlier, the lower back is strained during a shift in gravity. When one stretches upper leg muscles and lower back, the tension would begin to release, thereby, alleviating pressure on lower back.

Apart from helping to feel calm all the time, yoga is also beneficial in reducing pain and fatigue associated with childbirth and taking care of newborn. Keep in mind that nursing and carrying the baby can be a tough job. With that in mind, it can take a toll on body resulting in back aches, pain, and fatigue. As one practices yoga regularly relieves her body from aches and pains. Several poses in yoga that specifically target and ease back pain and fatigue. In addition to that, it also improves circulation and flexibility. Plus, it eases discomfort as she carried baby. Yoga also helps to cope with the demands of being a mother. With yoga classes, one can relax and find time. It gives the opportunity to be with everybody who's also going through a tough time taking care of babies.

Thus, yoga is beneficial. It is ultimate answer to relieve any stress and discomfort after giving birth. The benefits of yoga are immense. It is also beneficial if one enroll in yoga class to ensure that she is doing the yoga poses properly which would help to performing yoga, in addition to those nine wonderful benefits of yoga for women after pregnancy, there are plenty more that one can discover to goes back

to doing yoga (<https://ahopefulhappenstance.com/9-benefits-of-yoga-for-the-postpartum-mom/>).

1.16 RESISTANCE TRAINING

Resistance training is a form of strength training in which each effort is performed against a specific opposing force generated by resistance. Resistance training is a common component of sports and physical fitness programs. Resistance training programs may include the use of free weights, weight machines, elastic tubing, or an athlete's own body weight.

Resistance training, also known as weight training or strength training has gained great popularity in recent years, largely due to its appeal and positive impact on many diverse populations, such as athletic, recreational and clinical communities. Thus, resistance training programmes are used to achieve many different goals, such as performance improvement, injury rehabilitation, muscle tone improvement and strength improvement (**American College of Sports Medicine, 2001**). It emphasized that resistance training increases the concentration of various hormones and growth-promoting agents with the body that may contribute to this improved muscular strength and size.

Marked evidence indicates that regular participation in a resistance training program or a plyometric training program can improve measures of strength and power in adults (**Chu, 1998; Fleck and Kraemer, 2004**). Studies also suggest that changes in motor performance skills resulting from the performance of combined resistance training and plyometric training are greater than with either type of training alone (**Adams et al., 1992; Fatouros et al., 2000; Polhemus et al. 1981**). Thus, both resistance training and plyometric training are typically recommended for adults when gains in motor performance are desired (**Adams, et al. 1992**).

1.16.1 IMPORTANCE OF RESISTANCE TRAINING

The importance of the functional training as follows,

- Resistance training is a concerted effort to use resistance or weights to work a muscle group.
- Many people falsely believe that being active, such as standing and moving during a shift at work, or doing house work, is enough effort to keep muscles healthy and strong.
- Being active is beneficial to the body, but it takes a focused effort to work muscles by either using weights or own body weight, to get the benefits of strength training.

1.16.2 BENEFITS OF RESISTANCE TRAINING

- Increases muscle mass, and muscle burns more calories than fat. Even at rest, the body will burn more calories strength train regularly. As muscle mass increases, metabolism increases, making it easier to maintain a healthy body weight.
- Helps to slow down or halt muscle loss that accompanies aging. A typical adult loses about one-half pound of muscle per year after the age of 20, which means feel less energetic and generally weaker.
- Improve fitness variables such as glucose metabolism, blood pressure, muscle strength endurance, body composition and even insulin sensitivity.
- Strength training is very effective at reducing depression in older adults **(Singh, Clements and Fiatarone, 1997)**.
- Coordination required to strength train keeps the brain active.

- Spend a few minutes before exercising to warm muscles and connective tissues up and reduce risk for injury. Helps to manage or reduce pain from ailments such as arthritis and old injuries.
- Engage in a strength training program that is designed to achieve muscle balance. Make sure each muscle has a chance to be worked equally. Perform all exercises through a full range of motion.
- Breathe through each exercise. Inadvertently holding the breath while strength training can cause excessive stress to the heart.
- Progressive resistance exercise can produce substantial increases in strength and muscle size, even in the oldest old. For many older patients, resistance training represents the safest, least expensive means to lose body fat, decrease blood pressure, improve glucose tolerance, and maintain long term independence (**Evans, 1996**).
- The increase in size of muscle is referred to as hypertrophy. In contrast, chronic hypertrophy refers to the increase in muscle size associated with long term resistance training.
- Resistance training programs can increase fat-free mass and decrease the percentage of body fat, as it relates to weight loss, is the positive impact of increasing energy expenditure during the exercise session.
- The strength trained athletes have shown that there is an increase in left ventricular wall thickness, absolute left ventricular wall mass, and septum (wall separating the left and right ventricles) wall thickness with resistance training (**Stone, et al., 1991**).
- Resistance training improves that low concentrations of total cholesterol and low density lipoprotein cholesterol and high levels of high density lipoprotein

cholesterol are associated with a decrease in coronary heart disease. Lower concentrations of blood triglycerides and low density lipoprotein cholesterol, along with higher levels of high density lipoprotein cholesterol have been observed with endurance trained individuals.

- Resistance training improved glucose tolerance and reduced insulin responses to oral glucose, glucose tolerance and insulin sensitivity.

1.17 EFFECT OF TRAINING ON DIFFERENT VARIABLES

The yoga and resistance training adequate intensity and volume of stimulus leads to noticeable changes in the physical, physiological and psychological system of the body. Though the combined and isolated effect of yoga and resistance training was supported by circulatory system, respiratory system, nervous system, endocrine system, muscular system and many other relative systems, the actual work is done at tissue level especially in the active muscles. To assess the combined and isolated effect of yoga and resistance training programmes and to study the changes which take place in the physical, physiological and psychological variables such as flexibility, body mass index, mean arterial blood pressure, forced vital capacity, breath holding time, mood state and its sub scales tension, depression, anger, vigour, fatigue and confusion.

1.17.1 FLEXIBILITY

Flexibility is a pre requisite for maximal development of movement force and speed. Greater range of movement enables the muscles to develop more force and speed. It also allows movements with minimum of muscle tension and internal resistance help in achieving higher movement economy (**Singh, 1991**).

Movement about a joint creates changes in pressure in the joint capsule that derive nutrients from the synovial fluid towards the articulation cartilage of the joint

(Baechle, 1994). The motor learning requires adequate level of flexibility of the concerned joints. Flexibility is joint specific, in other words, a high degree of flexibility in one joint differs from other joints. For example, back stroke in swimming needs more shoulder flexibility; wrist flexibility of shot putter and discus thrower is greater and there is above average flexibility of gymnasts in the hip **(Edward and Mathews, 1985).**

Flexibility is significant in performing sports skills and also in physical medicine such as rehabilitation, general health and fitness and flexibility exercises are important for relief of dysmenorrhea (it is a gynecological medical condition of pain during menstruation that interferes with daily activities), general neuromuscular tensions and low back pains **(Baechle, 1994).** Inadequate flexibility leads to errors in movement execution. Because of its effect on technique it assumes importance for tactical skills. Optimum level elasticity, stretchability and suppleness of muscles and ligaments help in absorbing the shocks and external forces tending to cause an injury **(Singh, 1991).**

1.17.2 BODY COMPOSITION

In physical fitness, body composition is used to describe the percentages of fat, bone and muscle in human bodies. Because muscular tissue takes up less space in our body than fat tissue, our body composition, as well as our weight, determines leanness. Two people at the same height and same body weight may look completely different from each other because they have a different body composition. Body composition measured in several ways. The most common method is by using a set of measurement calipers to measure the thickness of subcutaneous fat in multiple places on the body. This includes the abdominal area, the subscapular region, arms, buttocks

and thighs. These measurements are then used to estimate total body fat with a margin of error of approximately four percentage points (Voorhees, 2007).

1.17.3 BODY MASS INDEX

The body mass index (BMI) is a statistical measurement which compares a person's weight and height. Though it does not actually measure the percentage of body fat, it is used to estimate a healthy body weight based on how tall a person is. Due to its ease of measurement and calculation, it is the most widely used diagnostic tool to identify weight problems within a population, usually whether individuals are underweight, overweight or obese. It was invented between 1830 and 1850 by the Belgian polymath Adolphe Quetelet during the course of developing “social physics”. Body mass index is defined as the individual's body weight divided by the square of his or her height. The formulae universally used in medicine produce a unit of measure of kg/m^2 . BMI can also be determined using a BMI chart, which displays BMI as a function of weight (horizontal axis) and height (vertical axis) using contour lines for different values of BMI or colours for different BMI categories (Garabed, 2008).

$$\text{BMI} = \frac{\text{mass (kg)}}{\text{height}^2 (\text{m}^2)}$$

BMI provided a simple numeric measure of a person's “fatness” or “thinness”, allowing health professionals to discuss over and under-weight problems more objectively with their patients. However, BMI has become controversial because many people, including physicians, have come to rely on its apparent numerical authority for medical diagnosis, but that was never the BMI's purpose; it is meant to be used as a simple means of classifying sedentary (physically inactive) individuals with an average body composition. For these individuals, the current value settings

are as follows: a BMI of 18.5 to 25 may indicate optimal weight; a BMI lower than 18.5 suggests the person is underweight while a number above 25 may indicate the person is overweight; a BMI below 17.5 may indicate the person has anorexia nervosa or a related disorder; a number above 30 suggests the person is obese (over 40, morbidly obese) (**WHO, 2002**).

1.17.4 BLOOD PRESSURE

Blood pressure is the pressure exerted by circulating blood upon the walls of blood vessels. The blood pressure usually refers to the arterial pressure of the systemic circulation. During each heartbeat, blood pressure varies between a maximum (systolic) and a minimum (diastolic) pressure. The blood pressure in the circulation is principally due to the pumping action of the heart (**Caro and Collins, 1978**).

1.17.5 SYSTOLIC BLOOD PRESSURE

Systolic blood pressure is specifically the maximum arterial pressure during contraction of the left ventricle of the heart. The time at which ventricular contraction occurs is called systole. In a blood pressure reading, it is the number on the top. The top and bottom blood pressures are both too high, a person is said to have high blood pressure. The top number is higher than 140 mmHg, the person has a condition called isolated systolic hypertension. The normal level of systolic blood pressure is 120-139 mmHg.

1.17.6 DIASTOLIC BLOOD PRESSURE

The diastolic pressure is specifically the minimum arterial pressure during relaxation and dilatation of the ventricles of the heart when the ventricles fill with blood. Represented by the bottom number in a blood pressure reading, diastolic blood

pressure is considered low when the blood pressure reading is below 60 mmHg; a diastolic blood pressure reading higher than 90 mmHg is considered high.

1.17.7 IMPORTANCE OF SYSTOLIC AND DIASTOLIC BLOOD PRESSURE

Systolic blood pressure is the overall best predictor of future cardiovascular risk; however, there is much that can be learned from assessing diastolic blood pressure in relation to simultaneous levels of systolic blood pressure, because the former is not distorted by pressure amplification. Low diastolic blood pressure presenting as isolated systolic hypertension, results from elevation in stroke volume. This subtype of hypertension has a marked male predominance, occurs twice as frequently as essential hypertension, and is potentially not a benign condition. In contrast, isolated diastolic hypertension occurs predominantly with a high prevalence of metabolic syndrome. Indeed, persons with isolated diastolic hypertension frequently evolve into systolic-diastolic hypertension and are potentially at increased risk for future diabetes and cardiovascular complications. The older age population with isolated systolic hypertension and low diastolic blood pressure has a high prevalence of left ventricular hypertrophy, increased ventricular-arterial stiffness, and a tendency for diastolic dysfunction and heart failure. Finally, concordant very high diastolic blood pressure defines potential hypertensive urgencies, emergencies, secondary forms of hypertension, and other high peripheral resistance states **(Franklin, 2007)**.

1.17.8 VITAL CAPACITY

Force vital capacity is the maximum volume of air that a person can exhale after maximum inhalation. It can also be the maximum volume of air that a person can inhale after maximum exhalation.

Vital capacity is operationally defined as the maximum amount of air that can be inspired and expired in one maximal inspiration and expiration and measured in liters/min (**Sarada, 2004**).

A person's vital capacity can be measured by a spirometer which can be a wet or regular spirometer. In combination with other physiological measurements, the vital capacity can help make a diagnosis of underlying lung disease. The unit that is used to determine this vital capacity is milliliters.

Vital capacity is the maximum amount of air a person can expel from the lungs after first filling the lungs to their maximum extent and then expiring to the maximum extent. It equals the inspiratory reserve volume plus the tidal volume plus the expiratory reserve volume.

1.17.9 BREATH HOLDING TIME

Breath holding time is defined as the duration of time through which one can hold his / her breath without inhaling and exhaling after a deep inhalation. Breath holding time is defined as the duration of time through hold breath without inhaling and exhaling after a deep inhalation (**Strukie, 1981**).

There are two types of breath hold time:

- Positive Breath holding time
- Negative Breath holding time

Endurance type of training will improve the breath holding time. Breath holding time also plays a vital role in the sports performance (**Strukic, 1981**).

1.17.10 MOOD STATE

Mood is defined as a short term feeling state that may fluctuate within minutes to days. In contrast to emotions, moods are more transient, often unrelated to external events and have varying intensities. Moods influence our overall sense of

well-being, and impact both behavior patterns and perceived health. The Profile of Mood States (POMS) is a self report psychological instrument intended for use with adults age 18 and above (**Berger and Motl, 1998**).

The Profile of Mood States (POMS), to provide indices of POMS reliability and validity, and to contrast the reliability characteristics of the POMS and various short forms of the POMS. A brief description of the short forms of the POMS is presented and it seems that these short forms have merit. Support was found for six POMS subscales,

- Tension
- Depression
- Anger
- Vigour
- Fatigue
- Confusion

1.17.11 TENSION

Tension is similar to a state of stress, though people experiencing tension tend to describe feelings of tightness, overwhelming anxiety, and uncertainty. Tension can be an individual phenomenon, such as when a person is so overwhelmed at work that feels tension. But tension is also sometimes used to characterize relationships in which stress leads to distance or hostility.

Although psychological tension is often thought of as a brain state that is unrelated to the body, emotional tension can lead to physical tension. People under stress often report physical symptoms such as a pit in the stomach, stiff muscles, or painful joints. Chronic tension can lower immune function and lead to a host of health problems.

1.17.12. DEPRESSION

As the focus of this chapter is postpartum depression, only a brief overview shall be provided here. Data from a huge population based study showed that nonpsychotic postpartum depression is the most common complication of childbearing, occurring in 10 - 15% of women after delivery (**O'Hara & Swain, 1996**).

It usually begins within the first six weeks postpartum and most cases require treatment by a health professional. The signs and symptoms of postpartum depression are generally the same as those associated with major depression occurring at other times, including depressed mood, anhedonia and low energy. Reports of suicidal ideation are also common.

Screening for postnatal mood disturbance can be difficult given the number of somatic symptoms typically associated with having a new baby that are also symptoms of major depression, for example, sleep and appetite disturbance, diminished libido, and low energy (**Nonacs & Cohen, 1998**). Whilst very severe postnatal depressions are easily detected, less severe presentations of depressive illness can be easily dismissed as normal or natural consequences of childbirth.

Depression is classified as a mood disorder. The feelings of sadness, loss, or anger that interfere with a person's everyday activities. Conditions that can get worse due to depression include:

- Arthritis
- Asthma
- Cardiovascular Disease
- Cancer
- Diabetes
- Obesity

It's important to realize that feeling down at times is a normal part of life. Sad and upsetting events happen to everyone. But, feeling down or hopeless on a regular basis, you could be dealing with depression.

Depression Symptoms

Women may experience symptoms related to their:

- Mood, such as irritability
- Emotional wellbeing, such as feeling sad or empty, anxious or hopeless
- Behavior, such as loss of interest in activities, withdrawing from social engagements, thoughts of suicide
- Cognitive abilities, such as thinking or talking more slowly
- Sleep patterns, such as difficulty sleeping through the night, waking early, sleeping too much
- Physical wellbeing, such as decreased energy, greater fatigue, changes in appetite, weight changes, aches, pain, headaches and increased cramps.

1.17.13 ANGER

Anger is one of the basic human emotions, as elemental as happiness, sadness, anxiety, or disgust. These emotions are tied to basic survival and were honed over the course of human history. Anger is related to the “fight, flight, or freeze” response of the sympathetic nervous system; it prepares humans to fight. But fighting doesn't necessarily mean throwing punches; it might motivate communities to combat injustice by changing laws or enforcing new behavioral norms.

Anger too easily or frequently mobilized can undermine relationships and it can be deleterious to bodies in the long term. Prolonged release of the stress hormones that accompany anger can destroy neurons in areas of the brain associated with judgment and short-term memory and weaken the immune system.

1.17.14 VIGOUR

Vigour is the sense of possessing physical strength, emotional energy and cognitive liveliness (**Lopez, 2009**). Vigor refers to individual's feelings that possess physical strength, emotional energy and cognitive liveliness and represents a moderate intensity affect experienced at work.

1.17.15 FATIGUE

Fatigue is a state of awareness describing a range of afflictions, usually associated with physical and/or mental weakness, though varying from a general state of lethargy to a specific work-induced burning sensation within muscles. Physical fatigue is the inability to continue functioning at the normal levels of physical activity. It is ubiquitous in everyday life, but usually becomes particularly noticeable during heavy exercise. Mental fatigue, on the other hand, rather manifests in sleepiness.

Fatigue has two known forms; one manifest as a local, muscle specific incapacity to do work, and the other manifests as an overall, bodily or systemic, sense of energy deprivation. Due to these two divergent facets of fatigue symptoms, it has been proposed to look at the causes fatigue from "central" and "peripheral" perspectives (**Gandevia, 1992; Kent-Braun, 1999**).

Mental Fatigue - In addition to physical, fatigue also includes mental fatigue, not necessarily including any muscle fatigue. Such a mental fatigue, in turn, can manifest itself either as decreased wakefulness or just as a general decrease of attention, not necessarily including sleepiness.

Physical fatigue or muscle weakness is a direct term for the inability to exert force with ones muscles to the degree that would be expected given the individual's general physical fitness. True weakness is substantial, while perceived rather is a sensation of having to put more effort to do the same task. On the other hand, central

muscle weakness is an overall exhaustion of the whole body, while peripheral weakness is an exhaustion of individual muscles. There are seen to be two main types of physical fatigue; Central and Peripheral.

Central Fatigue: The central component to fatigue is generally described in terms of a reduction in the neural drive or nerve-based motor command to working muscles that result in a decline in the force output (**Gandevia, 2001; Kay et al., 2001; Kent-Braun, 1999; Vandewalle et al., 1991**).

Peripheral Fatigue: Fatigue during physical work is considered an ability for the body to supply sufficient energy to the contracting muscles to meet the increased energy demand. This causes contractile dysfunction that is manifested in the eventual reduction or lack of ability of a single muscle or local group of muscles to do work. The insufficiency of energy, i.e. sub-optimal aerobic metabolism, generally results in the accumulation of lactic acid and other acidic anaerobic metabolic byproducts in the muscle, causing the stereotypical burning sensation of local muscle fatigue.

The fundamental difference between the peripheral and central theories of fatigue is that the peripheral model of fatigue assumes failure at one or more sites in the chain that initiates muscle contraction. Peripheral regulation is therefore dependent on the localized metabolic chemical conditions of the local muscle affected, whereas the central model of fatigue is an integrated mechanism that works to preserve the integrity of the system by initiating fatigue through muscle de-recruitment, before cellular or organ failure occurs.

1.17.16 CONFUSION

Confusion is a symptom that makes feel thinks clearly. The feeling of disoriented and hard time focusing or making decisions. Confusion is also referred to as disorientation. In its extreme state, it's referred to as delirium.

Some signs of confusion include:

- Slurring words or having long pauses during speech
- Abnormal or incoherent speech
- Lacking awareness of location or time
- Forgetting what a task is while it's being performed
- Sudden changes in emotion, such as sudden agitation

The confusion alongside the following symptoms:

1. Dizziness
2. Rapid heart beat
3. Clammy skin
4. Fever
5. Headache
6. Shivering
7. Irregular breathing
8. Weakness on one side of the body
9. Slurred speech

1.18 NEED OF THE STUDY

Early postpartum period focuses on recovering from delivery and caring for the infant and the importance of resuming physical activity during this time is often not made clear to women, many of whom need guidance to begin or resume physical activity. Pregnant women who planned to exercise after their child's birth, only 15% reported that their physician discussed with them the appropriate time to begin exercising after delivery (**Krans, et al., 2005**). This period is therefore often a missed life course opportunity for beginning or resuming physical activity. Previously active women who do not resume their pre-pregnancy physical activity levels may remain

inactive for many years. The World Health Organization's guideline on physical activity recommends that adults age 18 to 64 years engage in at least 150 minutes of moderate intensity aerobic activity throughout the week in bouts of at least 10 minutes, or at least 75 minutes of vigorous intensity aerobic activity, or an equivalent combination of the two. Muscle strengthening should be done two or more days per week. The guideline states that postpartum women may need extra precaution and should seek medical advice before striving to achieve these recommendations. Country specific postpartum physical activity guidelines inform both health care providers and women about safe levels of physical activity during this unique time period.

Postpartum guidelines for physical activity should help women quickly achieve levels of physical activity that are commensurate with guidelines for all adults. Several attempts have been made by different researches to find out suitable physical activity guidelines for the benefit of postpartum women. However, there were little efforts made to find out the effect of yogic practices, resistance training and combined yoga and resistance exercises on selected physical, physiological and psychological variables among postpartum women.

1.19 OBJECTIVE OF THE STUDY

The study aims at finding out the effect of isolated and combined effect of yoga and resistance training on selected physical, physiological and psychological variables among postpartum women. In doing so, the study would

1. To assess selected physical, physiological and psychological variables of postpartum women
2. To develop yogic practices and resistance exercises beneficial for postpartum women

3. Experiment with combined and isolated yoga and resistance training among postpartum women and
4. To find out the influences of experimental treatments on selected physical, physiological and psychological variables compared to control group and within the experimental groups.

1.20 STATEMENT OF THE PROBLEM

The purpose of this study was to assess the combined and isolated effect of yoga and resistance training on selected physical, physiological and psychological variables among postpartum women.

1.21 SIGNIFICANCE OF THE STUDY

This study was significant in the following ways:

1. The study was significant in highlighting the importance of yoga and resistance training for the healthful living of postpartum women.
2. The study was significant in formulating and suggesting suitable yogic practices and resistance training for postpartum women in altering their physical, physiological and psychological levels.
3. The study was further significant in finding out whether isolated yogic practices or resistance training or combination of yogic practices and resistance training is better in altering selected physical, physiological and psychological variables among postpartum women
4. The study was unique in comparing the effects of combined and isolated yoga and resistance exercises on selected physical, physiological and psychological variables among postpartum women.
5. The findings of this study would help to understand the status of postpartum women's physical, physiological and psychological variables.

6. The findings of this study would create interest among future researchers to make further studies on this area.

1.22 HYPOTHESES

1. It was hypothesised that there would be a significant improvement on selected physical, physiological and psychological variables among postpartum women due to combined and isolated yoga and resistance training.
2. It was hypothesised that there would be a significant differences between combined and isolated yoga and resistance training groups in improving selected physical, physiological and psychological variables among postpartum women.
3. It was hypothesised that comparing between treatment groups, namely, combined group would be significantly better than isolated yoga and isolated resistance training groups in altering selected physical, physiological and psychological variables of postpartum women comparing to control group.

1.23 DELIMITATIONS

The study would be further delimited in the following respects.

1. Forty postpartum women who gave normal birth at Hospitals, Bangalore, Karnataka State were selected for this study.
2. Randomly selected forty postpartum women in upper age limit 35 years were considered for this study.
3. The following dependent and independent variables were selected for this study

DEPENDENT VARIABLES

Physical Variables

- Flexibility

- Body Mass Index

Physiological

- Mean Arterial Blood Pressure
- Forced vital capacity
- Breath Holding time

Psychological Variables

- Mood State and its sub scales such as Tension, Depression, Anger, Vigour, Fatigue and Confusion

INDEPENDENT VARIABLES

- Combined Training (isolated yogic practices and isolated resistance training)
- isolated yogic practices
- Isolated resistance training

1.24 LIMITATIONS

The following limitations were considered while interpreting the results of the study.

1. The weather conditions such as atmospheric temperature, humidity, exposure of light and dark and meteorological factors during testing period were not considered.
2. Though the subjects were motivated verbally, no attempt was made to differentiate the motivation level during the period of testing.
3. No effort was made to control the nature of life style, nutritional status, the daily dietary intake, physiological factors and prescribed medicines that affect metabolic function.
4. Medications were not controlled.

5. The subjects were from different social, cultural and economic backgrounds.

1.25 DEFINITION AND EXPLANATION OF TERMS

1.25.1 YOGA

Yoga is a way of life which can be practiced by any human being regardless of age and condition of health. Yoga is a gaining process of control over the mind, thereby improving the physiological and psychological behaviour of an individual **(Sharma, 1984)**.

1.25.2 ASANA

Asana means holding the body in a particular posture to bring stability to the body and poise to the mind. The exercises of asana bring purity in tabular channels firmness to the body and vitality to the body and the mind **(Sharma, 1984)**.

1.25.3 RESISTANCE TRAINING

Resistance training is an exercise programme where free, stationary weights and own body weight are used for the purpose of increasing muscular strength, endurance and power through which skills can be improved **(Kent, 1994)**.

1.25.4 FLEXIBILITY

Flexibility is the range of movement about a joint.

Flexibility is operationally defined as maximum number of centimeters reached on performing the sit and reach test at maximum possible movement and was measured by nearest centimeters **(Ted and Andrew Jackson, 1987)**.

1.25.5 BODY MASS INDEX

In order to find out whether an individual is overweight or not, body mass index is used.

For the operational purposes body mass index is calculated by dividing the subject's body weight in kilogram by their height in meters squared (**Palanivel, C 2004**).

1.25.6 MEAN ARTERIAL BLOOD PRESSURE

Mean arterial blood pressure is defined as the average arterial pressure during a single cardiac cycle. As blood is pumped out of the left ventricle into the arteries, pressure is generated. The mean arterial pressure is determined by the cardiac output, systematic vascular resistance and central venous pressure according to the following relationship, which is based upon the relationship between flow, pressure and resistance (**Caro and Colins, 1978**).

1.25.7 FORCED VITAL CAPACITY

The volume of air that can be moved out of the lungs after maximum inspiration is called vital capacity (**Fox and Mathews, 1981**).

1.25.8 BREATH HOLDING TIME

Breath holding time is define as the duration of time through which one can hold his breath without the study of all living things (**Laurence E. Morehouse and Augustus T.Miller, 1967**).

1.25.9 MOOD STATE

A person's mood is an observable affective state, which can consists of a combination of emotions.

1.25.10 TENSION – ANXIETY (T)

Tension is a wide range of strong external stimuli, both physiological and psychological, which can cause a physiological response called general adaptation syndrome (**Hans Selye, 1936**).

1.25.11 DEPRESSION - DEJECTION (D)

Depression is defined as a condition that primarily entails a disturbance of mood, this affective disturbance is often characterized by a mood that is sad, hopeless, discouraged or simply depressed (**Lopez, 2009**).

1.25.12 ANGER – HOSTILITY (A)

Anger is defined as an internal, mental, subjective feeling state with associated cognitions and physiological arousal patterns (**Lopez, 2009**).

1.25.13 VIGOUR – ACTIVITY (V)

Vigour is the sense of possessing physical strength, emotional energy and cognitive liveliness (**Lopez, 2009**).

1.25.14 FATIGUE – INERTIA (F)

Fatigue is defined as a psychophysical condition in which the individual's mental and physical ability to work deteriorates (**Ramnath Sharma and Chandra, 2004**).

1.25.15 CONFUSION – BEWILDERMENT (C)

Confusion is defined as the state which a person experiences or is at risk of experiencing disturbance in cognition, attention, memory and orientation of an undetermined origin or onset (**Lopez, 2009**).

CHAPTER - II

REVIEW OF RELATED LITERATURE

The research for reference material is a time consuming but fruitful phase of the graduate programme. A familiarity with the literature in any problem area helps the students to discover what is already known, what others have attempted to find out, what methods have been promising disappointing, and what problems remain to be solved.

The literature in any field forms the foundation upon which all future work will be built". The reviews of literature are generally used as a basis for inductive reasoning for locating and synthesizing all the relevant literature on a particular topic.

The present chapter covers the available literature pertaining to the studies made on various aspects of assessment of fitness profiles. The review of literature has been collected from a number of pertinent studies undertaken by the physical educationists, sports scientists and sports administrators. Considering the purpose of the present study the reviews have been mainly classified into the following aspects:

1. Studies on the effect of yoga on postpartum women
2. Studies on different forms of physical exercises on postpartum women
3. Studies on different forms of psychological effects on postpartum women

2.1 STUDIES ON EFFECT OF YOGA ON POSTPARTUM WOMEN

Bailowitz, et al., (2017) conducted a research on Exercise-Associated Hyponatremia in a Lactating Female. To achieve the purpose study documented that a 37 year old woman presented to the emergency department with severe headache, which quickly progressed to altered mental status and seizure activity in hospital. Her initial serum sodium concentration ([Na]) was 126 mmol/L. In the 24 hours before

admission, she exercised vigorously for 120 minutes (interval training plus yoga) and also consumed more than 4 liters of fluid during that time to both stay hydrated and facilitate milk production because she was actively nursing 2 children. Her serum [Na] and altered mental status corrected slowly over the next 48 hours with furosemide, hypertonic saline, and fluid restriction. This case is unique because it discusses the possible pathogenic role that lactation-induced oxytocin release may have on sustained ant diuresis and dilutional exercise-associated hyponatremia (EAH). This would be the first report documenting EAH in a lactating woman, which may highlight an under recognized risk factor for physically active women who are concurrently breast-feeding

Huberty, et al., (2017) conducted a study protocol of a three-group randomized feasibility trial of an online yoga intervention for mothers after stillbirth (The Mindful Health study). To achieve the purpose of the study investigated the two phase randomized controlled trial. Phase 1 will involve (1) an iterative design process to develop the online yogaprescription for phase 2 and (2) qualitative interviews to identify cultural barriers to recruitment in non-Caucasian women (i.e., predominately Hispanic and/or African American) who have experienced still birth (N=5). Phase 2 is a three-group randomized feasibility trial with assessments at baseline, and at 12 and 20 weeks post- intervention. Ninety women who have experienced a stillbirth within 6 weeks to 24 months will be randomized into one of the following three arms for 12 weeks: (1) intervention lowdose (LD)=60min / week online - streamingyoga (n=30) intervention moderate dose (MD)= 150 min / week intervention moderate dose (MD)=150 min / week online-streaming yoga (n=30) or (3) stretch and tone control (STC) group = 60 min / week of stretching / toning exercises (n=30). This study will explore the feasibility and acceptability of a 12-week, home- based, online-streamed yoga intervention, with varying doses among mothers after a stillbirth. If feasible, the

findings from this study will inform a full-scale trial to determine the effectiveness of home-based online-streamed yoga to improve PTSD. Long-term, health care providers could use online yoga as a non-pharmaceutical, inexpensive resource for stillbirth aftercare.

Timlin and Simpson (2017) conducted a research on investigated postpartum Dru yoga intervention improves psychological wellbeing in first time mothers. First time mothers were recruited from a Sure Start Community Centre and included in the study if they had a baby aged between 6 weeks to one-year-old. Exclusion criteria were the presence of sciatica, bulging discs, heart disease or whiplash and if they already practiced yoga. Participants were randomized into a Dru yoga group (n=16) who received a one-hour Dru yoga session each week for 4 weeks and a 20-minute DVD for practice at home. The control group (n=16) who did not receive an intervention. Baseline and follow up measures of perceived stress, mood and coping were assessed in each group. A repeated measures factorial Analysis of Variance showed that in comparison to the control group, the Dru yoga intervention group had improved psychological well-being as indicated by reductions in stress, negative affect, and dysfunctional coping and increases in problem focused coping at follow up ($P < 0.05$). The current study shows that Dru yoga is beneficial for the psychological well-being of first time mothers. Further research is needed using large scale replication studies with a longer follow up period and including multiparous women. This study extends the support for yoga with postpartum mothers.

Reza, et al. (2018) conducted a research on Complementary Health Practices for Treating Perinatal Depression. To achieve the purpose of the study focused review of the evidence for several complementary health approaches (i.e., omega-3 fatty acids, folate, vitamin D, selenium, zinc, magnesium, B vitamins, physical activity and yoga)

in the treatment of perinatal depression. There is evidence that some of these treatments may be reasonable to consider in women during pregnancy or the postpartum period. However, there are little data on the comparative safety and efficacy of these relative to traditional treatments (eg, psychotherapy, pharmacotherapy). Adequately powered high-quality studies are necessary to determine the role of complementary health practices for treating perinatal depression.

Siff LN, et al. (2018) conducted a research on the effects of 10 common exercises to traditional pelvic floor muscle (PFM) contractions (Kegel) on levator hiatus (LH) area and PFM length and strength. This is a cross-sectional study of 15 healthy postpartum women. Ten exercises were studied. These were common variations of leg, core, and back exercises used in yoga, Pilates, strength training, and physical therapy. Each participant performed all 10 exercises at a single visit in 2 examination settings: Transperineal ultrasound and perineometry. Ultrasound measured the LH area and PFM length, and perineometry measured the muscle strength (peak squeeze pressure). Kegel generates an increase in squeeze pressure, shortens the muscles and narrows the LH. The bird dog and plank exercises were not different from Kegel in any measurement. While the leg lift ultrasound dimensions are similar to Kegel, leg lifts generated peak squeeze pressures stronger than any other exercise (including Kegel). Whereas ultrasound dimensions were similar to Kegel, tucked and untucked squats and thigh adductions generated weaker contractions than Kegel. While crunch generated a squeeze pressure similar to Kegel, the ultrasound dimensions showed a significantly wider LH and longer muscle than Kegel. Bridge, clam, and plié exercises affected the PFMs differently than Kegel in all measures. Bird-dog, plank, and leg-lift exercises should be evaluated as alternative exercises to Kegel as they affect PFM strength and length and LH area similarly to Kegel, and leg lifts generate a

stronger contraction than Kegel.

Anggraeni, et al (2019) Conducted a study on the effectiveness of postpartum yoga on uterine involution among postpartum women in Indonesia. To achieve the purpose of the study Sub uterine involution is one of the pathological symptoms of the postpartum period, which causes complications. This is indicated by the size of the fundus uterine, which is greater than the normal size and elongated outflow of lochia. One of the non-pharmacological methods for preventing sub uterine involution is postpartum yoga which focuses on physical and breathing exercises, strengthening of the pelvic floor muscles, and relaxation of autosuggestions. The study aimed to analyze the effectiveness of postpartum yoga on uterine involution. A quasi-experimental, pre-test and post-test with the control group was applied in this study. Thirty-eight postpartum women received postpartum yoga as the intervention group. The control group was comprised of 19 women. The gain score of uterine involution in the intervention group was 9.14 ± 1.27 and in the control group 7.20 ± 1.11 . The cohen's effect size test is 1.63. The result of the mannwhitney test showed that there was a significant difference between the intervention group and the control group with p value 0,000. The result of determination (r square), postpartum yoga had an effect of 40.3% on uterine involution after being controlled simultaneously with parity, frequency of breastfeeding, and anxiety. Postpartum yoga is effective to strengthen the uterine muscles, facilitate blood circulation, and stimulate neurohormonal so it could accelerate uterine involution. Further studies could measure of fundus uterine daily. Future researchers can develop postpartum yoga research with other variables such as anxiety, urinary incontinence, quality of life for postpartum women, and hormonal variables including oxytocin, endorphins, and cortisol.

2.2 EFFECTS OF DIFFERENT PHYSICAL ACTIVITIES ON POSTPARTUM WOMEN

Harrison, et al., (2016) documented that the rise in obesity and associated morbidity is currently one of our greatest public health challenges. Women represent a high risk group for weight gain with associated metabolic, cardiovascular, reproductive and psychological health impacts. Regular physical activity is fundamental for health and well-being with protective benefits across the spectrum of women's health. Preconception, Pregnancy and the early postpartum period represent opportune windows to engage women in regular physical activity to optimize health and prevent weight gain with added potential to transfer behavior change more broadly to children and families. This review summarizes the current evidence for the role of physical activity for women in relation to preconception (infertility, assisted reproductive therapy, polycystic ovary syndrome, weight gain prevention and psychological well-being) pregnancy (prevention of excess gestational weight gain, gestational diabetes and preeclampsia as well as labor and neonatal outcomes) and postpartum (lactation and breastfeeding, postpartum weight retention and depression) health. Beneficial outcomes validate the importance of regular physical activity, yet key methodological gaps highlight the need for large, high-quality studies to clarify the optimal type, frequency, duration and intensity of physical activity required for beneficial health outcomes during preconception, pregnancy and postpartum.

Saligheh, McNamara and Rooney (2016) explored women's beliefs about and experiences of PA and exercise during the 6 weeks to 12 months postpartum period. A cohort of 14 postpartum women from a survey study of the barriers and enablers to exercise participation agreed to take part in interview sessions to provide an in-depth understanding of the women's perceptions of the postpartum period and their physical

activity during this time. Findings are presented with reference to the social ecological framework and indicate postpartum women face substantial personal and environmental barriers to PA and exercise participation: fatigue, a lack of motivation and confidence, substantial time constraints, lack of access to affordable and appropriate activities and poor access to public transport. In contrast, enablers such as possessing greater social support, in particular partner support, improved PA and exercise participation. The findings encourage facilitation of exercise through mother's groups, mother's exercise clubs or postnatal classes suggesting behavioral and social change is needed. Interaction between individuals, community, organizations and policy makers is required. In addition, the provision of specifically tailored and appropriate exercise programs could potentially enable increased PA in postpartum women, thereby improving their health.

Szalewska and Skrzybowska (2016) examined physical activity patterns and their link to depressive symptoms in postpartum women. The secondary endpoint was the assessment of health awareness in women six months after delivery. Eighty postpartum women with a mean age of 27 ± 4 years (group A - 40 physically active women, group B - 40 women leading a sedentary lifestyle) completed a self-report questionnaire and The Edinburgh Postnatal Depression Scale (EPDS) questionnaire. The level of health awareness was statistically better in women who were physically active six months after delivery than in women who led a sedentary lifestyle. On a scale with a maximum 55 points, the mean scores were 47.4 in group A and 31.2 in group B. Depressive symptoms were more pronounced in group B. Twenty seven women from group A and three women from group B returned to their pre-pregnancy weight. Women who were physically active after delivery were characterized by higher health awareness and more frequent return to pre-pregnancy weight. Physical activity

may be important for reducing the risk of postnatal depression.

Downs, et al., (2017) examined differences in postpartum exercise (EX) and related personal/psychological correlates in women according to prepregnancy weight and pregnancy gestational weight gain (GWG) status and predictors of EX at Omaternity hospitalization and completed interviews to assess Ex (Leisure - Time Exercise Questionnaire) and personal correlates (demographics, anxiety / depressive symptoms) before / during pregnancy. Telephone interviews were conducted to assess postpartum EX / psychological correlates. Women were. Categorized according to pre pregnancy weight (normal and overweight) and pregnancy GWG status (above or within weight gain guidelines): normal-above, normal-within, overweight-above, and overweight-within. Low levels of EX minutes were observed in all women with significant differences for strenuous EX minutes. Correlates explained 14%-37% of the variance in postpartum EX; prepregnancy EX and pregnancy EX were strong determinants of early postpartum EX, and early postpartum EX predicted 6-month postpartum EX. Unique predictors of EX also emerged. These study findings highlight the benefits of EX before / during pregnancy for promoting postpartum EX and suggest tailoring postpartum EX interventions based on personal / psychological correlates to maximize effectiveness.

Ferrari and Graf (2017) reported that regular physical activity during and after pregnancy has beneficial effects for mother and child. German recommendations for physical activity during pregnancy are still missing. A systematic literature research identified 29 articles. Recommendations in the context of specific diseases (gestational diabetes, preeclampsia, obesity, hypertension, PCO, incontinence) or intervention programs were excluded. Only 2 articles met the criteria. 2 separate articles summarizing all international recommendations for physical activity during and after

pregnancy were included. In order for mother and child to benefit from physical activity, pregnant women without contraindications should be encouraged to participate in regular physical activity or to remain active. Healthy pregnant and postpartum women should exercise for at least 150 min per week (analogically 20-30 min per day on most or all days of the week) in moderate to vigorous aerobic intensity.

Forsyth, et al., (2017) examined the effectiveness of exercise in the management of postpartum depression (PPD), women living in an inner city, who were diagnosed using the Structured Clinical Interview for DSM-IV (Perinatal Version; SCID-PN), were randomly assigned to an exercise group (N = 12) or control group (N = 12). A focus group was carried out to explore women's views of the trial. There were no significant differences between the two groups for the SCID-PN. Although women who had engaged in the exercise viewed it positively (based on focus group data), low adherence to exercise meant that significant improvements in PPD were not found.

Hutt, et al., (2017) examined the extent to which higher levels of mother's exercise during the postpartum period were related to more positive and fewer negative emotion-expressive behaviors with their infant's fathers. Mother's (N = 46; M = 8 month postpartum) positive and negative expressive behaviors were coded during couple's discussions of current conflict and positive family experiences. Mothers self-reported their leisure-time exercise behavior. First-time mothers and mothers with higher levels of leisure-time exercise behavior displayed higher levels of positive expressive behaviors during couples' discussions. Exercise may be associated with increased positive emotion and, in turn, can have great potential to improve family relationships during the postpartum period when marital stress normatively increases, particularly for mothers with more than 1 child. Future longitudinal studies are needed to understand exercise patterns across the postpartum period to identify the most

effective timing and optimal level of exercise that lead to more positive expressive behaviors.

Kim and Lee (2017) evaluated bladder symptoms, fatigue, and physical activity according to time after birth and birth modes. A total of 290 women after giving birth responded to self-administered questionnaires. Multivariate analysis of variance determined the differences in variables. Bladder symptoms were significantly different by time after birth and birth mode; they were the highest in the first week after birth and in Cesarean birth. Postpartum fatigue showed a significant tendency by birth mode, but not by time after birth. Physical activity was significantly different by birth mode. The lowest level of physical activity was found for women who gave Cesarean birth. Moderate physical activity was also significantly different by time after birth, but vigorous physical activity was not significantly different. In conclusion, bladder symptoms and physical activity are different by time after birth and birth mode in postpartum women. The first week after giving is an important period postpartum when women whose bladder symptoms and physical activity should be of concern.

McCurdy, et al., (2017) examined the influence of exercise on depressive symptoms and the prevalence of depression in the postpartum period. Randomized controlled trials comparing postpartum exercise (structured, planned, repetitive physical activity) with the standard care for which outcomes assessing depressive symptoms or depressive episodes (as defined by trial authors) were assessed. Trials were identified as prevention trials (women from the general postpartum population) or treatment trials (women were classified as having depression by the trial authors). Effect sizes with 95% confidence intervals (CIs) were calculated using Hedges' *g* method and standardized mean differences in post-intervention depression

outcomes were pooled using a random - effects model. Across all 16 trials (1,327 women), the pooled standardized mean difference was -0.34, suggesting a small effect of exercise among all postpartum women on depressive symptoms. Among the 10 treatment trials, a moderate effect size of exercise on depressive symptoms was found. In six prevention trials, a small effect was found. In women with depression preintervention, exercise increased the odds of resolving depression post intervention by 54%. The trials included in this meta-analysis were small and some had methodologic limitations. Light-to-moderate intensity aerobic exercise improves mild-to-moderate depressive symptoms and increases the likelihood that mild-to-moderate depression will resolve.

Poyatos Leon, et al., (2017) determined the effect of physical activity interventions during pregnancy and the postpartum period for controlling postpartum depressive symptoms. We systematically searched Cochrane Library Plus, Science Direct, EMBASE, CINAHL, PubMed, Web of Science, and Scopus, from January 1990 to May 2016, for randomized or nonrandomized controlled trials addressing the effect of physical activity on postpartum depression. The inverse variance-weighted method was used to compute pooled estimates of effect size and respective 95% confidence intervals (95% CI) for physical activity intervention on postpartum depression. Subgroup analyses were performed comparing women with and without postpartum depressive symptoms according to specific scales measuring this construct. Meta-regression and sensitivity analysis were computed to evaluate heterogeneity. Twelve studies were included in the meta- analysis. Effect size for the relationship between physical activity interventions during pregnancy and the postpartum period on postpartum depressive symptoms was 0.41. Heterogeneity was $I^2 = 33.1\%$. When subgroup analyses were done, pooled effect sizes were 0.67 for mothers who met

postpartum depressive symptoms criteria at baseline based on specific scales, and 0.29 for mothers who did not meet those depressive symptoms criteria at baseline. Physical exercise during pregnancy and the postpartum period is a safe strategy to achieve better psychological well-being and to reduce postpartum depressive symptoms.

Pritchett, et al., (2017) conducted a qualitative study nested within a randomized trial of an exercise intervention for women with postnatal depression. Women described deterioration in their sense of identity postnatally and through experiencing depression and described the positive impact exercise had on their sense of self. Views of exercise as treatment for postnatal depression ranged from doubts about its practicality to positive comparisons with other traditional treatments and to improved recovery.

Pritchett, et al., (2017) investigated the effectiveness of aerobic exercise on postpartum depressive symptoms. The databases MEDLINE, EMBASE, Cochrane Library, Psyc INFO, Sport Discus, Clinical Trials.gov, and the World Health Organization International Clinical Trials Registry Platform were searched. Titles and abstracts, then full-text articles, were screened against inclusion criteria: RCTs measuring depressive symptoms in mothers ≤ 1 year postpartum; and interventions designed to increase aerobic exercise compared with usual care or other comparators. Included studies were assessed using the Cochrane Collaboration's risk of bias tool. Meta-analysis was conducted. Pre-planned subgroup analyses explored heterogeneity. Thirteen RCTs were included, with 1734 eligible participants. Exercise significantly reduced depressive symptoms when all trials were combined. Exploration of heterogeneity did not find significant differences in effect size between women with possible depression and in general postpartum populations; exercise only and exercise with co-interventions; and group exercise and exercise counselling. This

systematic review provides support for the effectiveness of exercise in reducing postpartum depressive symptoms. Group exercise, participant chosen exercise, and exercise with co-interventions all may be effective interventions. These results should be interpreted with caution because of substantial heterogeneity and risk of bias.

Quinlan, et al., (2017) examined whether a brief theory-based intervention can prevent a decline in physical activity among new parents over 6 months following intervention. This study protocol represents the first dyad-based physical activity initiative in the parenthood literature involving both mothers and fathers; prior research has focused on only mothers or only fathers (albeit limited), and has shown only short-term changes in physical activity. This study will be investigating whether a theory-based physical activity intervention can maintain or improve moderate to vigorous intensity physical activity measured via accelerometry of new parents over a 6 month period following intervention compared to a control group. This study is a 6 month longitudinal randomized controlled trial. Parents are measured at baseline (2 months postpartum) with two assessment points at 6 weeks (3.5 months postpartum) and 3 months (5 months postpartum) and a final follow-up assessment at 6 months (8 months postpartum). The content of the theory-based intervention was derived from the results of our prior longitudinal trial of new parents using an adapted theory of planned behavior framework to predict changes in physical activity. A total of 152 couples have been recruited to date. Sixteen couples dropped out after baseline and a total of 88 couples have completed their 6-month measures. If the intervention proves successful, couple-based physical activity promotion efforts among parents could be a promising avenue to pursue to help mitigate the declines of physical activity levels during parenthood. These findings could inform public health materials and practitioners.

Saligheh, et al., (2017) determined the efficacy of exercise or physical activity (PA) interventions on postnatal depression (PND) and weight loss, with a subsequent aim to identify more effective intervention approaches. Using PRISMA guidelines, data searches conducted across six databases. Nine studies fulfilled our inclusion criteria. Based on identified studies (some with high-quality RCT designs), there was inconsistency as to whether exercise or PA simultaneously reduced PND symptoms and assisted weight loss (or related body composition indices). Two (22.2%) identified changes in both outcomes with small effect sizes. Four studies (44.4%) reported changes in one outcome, typically PND with variable effect sizes, while three studies (33.3%) reported no effect. Studies implemented different exercise/PA modalities (commonly walking) and incorporated various support strategies to assist intervention participation and adherence. Studies identified as most likely to associate with PND and/or weight loss changes were those with supervision (1-1, group), structure (weekly frequency, scheduled durations and moderate intensity), which adhered to specific exercise/PA guidelines over an extended postpartum period (e.g. 12 weeks +) and were supplemented by several psycho-social support strategies (e.g. educational information, exercise/PA advice, and counselling). Future studies need to carefully address prior study methodological weaknesses (e.g. study design, inclusion criteria, measurement, reporting, assessing confounding factors), further examine proposed more beneficial exercise/PA intervention approaches, and consider how exercise/PA could be best delivered in practice to benefit women's postpartum health.

Sanda, et al., (2017) documented health benefits for mother and baby, physical activity (PA)-level tends to decline in pregnancy. Overweight / obese and physically inactive women are two selected groups at increased risk of pregnancy

complications. Thus, efficient strategies to maintain or increase PA-level in pregnancy and the postpartum period, especially among these women, are warranted. This secondary analysis examined the effect of a prenatal lifestyle-intervention on PA-level in late pregnancy and the first year postpartum, with subanalysis on initially physically active versus inactive and normal-weight versus overweight/obese women. The Norwegian Fit for Delivery (NFFD) randomized controlled trial included healthy primiparous women with singleton pregnancies and body mass index (BMI) ≥ 19 kg/m² assigned to an intervention group, n = 303 (twice weekly group-exercises and dietary counseling) or a control group, n = 303 (standard prenatal care). The International Physical Activity Questionnaire short-form was used to assess PA-levels at inclusion and the subgroups of normal-weight and initially active women. Intervention-effect was dependent on exercise-adherence among overweight/obese and inactive women. Compared to time of inclusion, the intervention groups maintained total PA-level at GW 36, while total PA-level decreased in the control groups. The PA-levels increased post-partum, but with no significant differences.

Aguilar-Cordero, et al., (2018) determined whether physical activity during pregnancy alleviates postpartum depression (PPD.) Randomized controlled trial in which the exercise group practiced moderate physical exercise in an aquatic environment (1-hour sessions, 3 days a week), following the recommendations of the SWEP method. The results observed in the Edinburgh Postnatal Depression Scale were significant between the exercise group and the control group ($p < .001$). In addition, significant differences were observed according in body mass index between the exercise group and control group in the overweight and obesity categories ($p < .05$). Women who perform moderate physical exercise in an aquatic environment are at lower risk of PPD than sedentary women. Overweight and obesity among sedentary

women during pregnancy are closely associated with positive screening for PPD.

Carter, et al., (2018) assessed the effectiveness of exercise/physical activity-based interventions in preventing and treating postpartum depressive symptoms in primiparous and multiparous women to the end of the postnatal period at 52 weeks postpartum. Electronic databases were searched for published and unpublished randomized controlled trials of exercise / physical activity - based. Interventions in preventing and treating depressive symptoms and increasing health-related quality of life in women from 4 to 52 weeks postpartum. The results of the studies were meta-analyzed and effect sizes with confidence intervals were calculated. The Grading of Recommendations Assessment and Development and Evaluation (GRADE) system was used to determine the confidence in the effect estimates. Eighteen trials conducted across a range of countries met the inclusion criteria. Most of the exercise interventions were aerobic and coaching compared to usual care, non-intervention and active controls. Small effect sizes of exercise-based interventions in reducing depressive symptoms were observed collectively and the quality of evidence was low across the individual studies. Although exercise-based interventions could create an alternative therapeutic approach for preventing major depression in postpartum women who experience subthreshold elevated depressive symptoms, the clinical effectiveness and the cost-effectiveness of exercise-based and physical activity interventions need to be better established. There is a need for further more rigorous testing of such interventions in high-quality randomized controlled trials against active control conditions before large-scale roll-out of these interventions in clinical practice is proposed.

Garnaes, et al., (2018) investigated the exercise training during pregnancy could reduce postpartum weight retention (PPWR) three months after delivery in overweight and obese women. We also measured circulating markers of cardio metabolic health, body composition, blood pressure, and physical activity level. This was a secondary analysis of a randomized controlled trial in which 91 women with $BMI \geq 28 \text{ kg/m}^2$ were allocated 1:1 to an exercise program or a control group. Women in the exercise group were prescribed three weekly, supervised sessions of 35 min of moderate intensity walking/running followed by 25 min of resistance training. The control group received standard maternal care. Assessments were undertaken in early pregnancy, late pregnancy, and three months postpartum. PPWR was defined as postpartum body weight minus early pregnancy weight. Seventy women participated three months after delivery, and PPWR was -0.8 kg in the exercise group (n=36) and -1.6 in the control group (n=34). Women in the exercise group had significantly lower circulating insulin concentration; 106.3 pmol/l compared to the control group, and showed a tendency towards lower homeostatic measurement of insulin resistance. No women in the exercise group compared to three women in the control group were diagnosed with type 2 diabetes postpartum. Of the women in the exercise group, 46.4% reported to exercise regularly, compared to 25.0% in the control group. Offering supervised exercise training during pregnancy among overweight/obese women did not affect PPWR three months after delivery, but reduced circulating insulin levels. This was probably due to a higher proportion of women being active postpartum in the exercise group.

Gluppe, et al., (2018) evaluated the effect of a postpartum training program on the prevalence of diastasis recti abdominis. The design was a secondary analysis of an assessor-masked randomized controlled trial. One hundred seventy-five prim parous women were randomized to an exercise or control group. The interrectus distance was palpated using finger widths, with a cutoff point for diastasis as ≥ 2 finger widths. Measures were taken 4.5 cm above, at, and 4.5 cm below the umbilicus. The 4-month intervention started 6 weeks postpartum and consisted of a weekly, supervised exercise class focusing on strength training of the pelvic floor muscles. In addition, the women were asked to perform daily pelvic floor muscle training at home. The control group received no intervention. Analyses were based on intention to treat. The Mantel - Haenszel test (relative risk [RR] ratio) and the chi-square test for independence were used to evaluate between-group differences on categorical data. At 6 weeks postpartum, 55.2% and 54.5% of the participants were diagnosed with diastasis in the intervention and control groups, respectively. No significant differences between groups in prevalence were found at baseline, at 6 months postpartum. A weekly, postpartum, supervised exercise program, including strength training of the pelvic floor and abdominal muscles, in addition to daily home training of the pelvic floor muscles, did not reduce the prevalence of diastasis.

Lewis, et al., (2018) examined the effect of exercise and wellness interventions on preventing postpartum depression among women at risk. Specifically, women (n = 450) who were on average 4.35 weeks postpartum and had a history of depression were randomly assigned to one of the following three conditions: (1) Telephone - based exercise intervention; (2) telephone - based wellness / support intervention (covered topics such as sleep, stress, and healthy eating); or (3) usual

care. Both interventions lasted six months. The exercise intervention was based on social cognitive theory and the Transtheoretical model and was specifically designed to motivate postpartum women to exercise. The primary dependent variable was depression based on the Structured Clinical Diagnostic Interview (SCID). Secondary dependent variables included the Edinburgh Postnatal Depression Scale, PHQ-9, and Perceived Stress Scale. Potential mediator variables included quality of sleep, postpartum social support, fatigue, and exercise attitudes. Questionnaires were administered at baseline, six, and nine months. The purpose of this paper is to summarize the methodology, study design, and baseline data for this study. This trial will provide important information regarding the efficacy of exercise and wellness interventions for preventing postpartumdepression.

Szumilewicz (2018) provided answers to the questions concerning who and how should prescribe and conduct exercise programs for pregnant women. Close cooperation between the woman, her obstetric care provider and exercise specialists is necessary to promote exercise in pregnancy. Obstetricians should carefully evaluate women with medical or obstetric complications before starting the exercises. They should also provide women with general information about the benefits of prenatal exercise and the risks of physical inactivity. On the other hand, the design and implementation of the exercise program are tasks for exercise professionals, preferably ones qualified according to the European educational standards for Pregnancy and Postnatal Exercise Specialists. Both empirical observation and scientific research confirm the need to educate obstetric care providers, exercise professionals, and both pregnant women and their families about prenatal physical activity. They all require constantly updated information on how to use exercise to stimulate the positive development of pregnancy, ensure the greatest possible well-being for the future

mother, and prepare her for childbirth and the postpartum period. These educational activities should be evidence-based. They must not perpetuate unfounded opinions, often harmful to the woman's health, on what she should or should not do while exercising during pregnancy. The presented update underlines some pertinent recommendations in this area.

Vargas Terrones, et al.,(2018) examined the effect of an exercise programme during pregnancy on the risk of perinatal depression. Healthy women who were < 16 weeks pregnant were randomly assigned to two different groups. Women in the intervention group participated in a 60 min exercise programme throughout pregnancy, 3 days per week, which was conducted from October 2014 to December 2016. The Center for Epidemiological Studies-Depression Scale was used to measure the risk of depression at the beginning of the study (12-16 weeks), at gestational week 38 and at 6 weeks postpartum. One hundred and twenty-four pregnant women were allocated to either the intervention (IG=70) or the control (CG=54) group. No differences were found in the percentage of depressed women at baseline. A smaller percentage of depressed women were identified in the IG compared with the CG at 38 gestational weeks and at 6 weeks postpartum using the per-protocol analysis. No significant differences were found using the intention-to-treat analyses, except in the multiple imputation analysis at week 38. An exercise programme performed during pregnancy may reduce the prevalence of depression in late pregnancy and postpartum.

Watson, et al., (2018) examined longitudinally the bidirectional relationship between exercise and maternal mental health symptoms during the perinatal period, and included adjustment for both depression and antidepressant treatment. Data were collected across pregnancy (first and third trimesters) and the postpartum (six and 12 months) for 258 women drawn from an Australian pregnancy cohort, the Mercy

Pregnancy and Emotional Wellbeing Study (MPEWS). The women were assessed for depression using the EPDS, anxiety using the STAI and a clinical diagnostic interview (SCID-IV), and self-reported use of antidepressants. Exercise was measured using self-reported weekly frequency of 30-min bouts of moderate to vigorous exercise, and data were analyzed using parallel process growth curve modelling. On average, women's weekly exercise frequency declined during pregnancy, returning to first trimester levels by 12 months postpartum. Women with depression and taking antidepressants reported lower first trimester exercise compared to control women. However, where non-medicated depressed women remained lower and continued to decline to 12 months, women taking antidepressants reported increasing levels of exercise during the perinatal period. Notably, a steeper decline in exercise frequency during the perinatal period was associated with a faster rate of increase in depressive and anxiety symptoms. This study is the first to examine the longitudinal interaction between exercise and mental health symptoms across the perinatal period. These preliminary findings demonstrate potential benefits for depressive and anxious symptoms when maintaining levels of early-pregnancy exercise throughout pregnancy and the postpartum.

Yang and Chen (2018) determined whether the aerobic gymnastic exercise improves stress, fatigue, sleep quality and depression in postpartum women. Single blinded, randomized controlled trial held from December 2014 until September 2015. To achieve the purpose of the study 140 eligible postnatal women were systematically assigned, with a random start to experimental (n=70) or a control (n=70) group. Engage in aerobic gymnastic exercise at least three times (15min per section) a week for three months using compact disc in the home. Perceived Stress Scale, Postpartum Fatigue Scale, Postpartum Sleep Quality Scale, and Edinburgh Postnatal Depression Scale. In a two-way ANOVA with repeated measures, the aerobic gymnastic exercise group

showed significant decrease in fatigue after practicing exercise 4 weeks and the positive effects extended to the 12-week posttests. Paired t-tests revealed that aerobic gymnastic exercise participants had improved significantly in perceived stress and fatigue after 4 weeks gymnastic exercise; these positive effects extended to the 12-week posttests. In addition, the changes in physical symptoms-related sleep inefficiency after 12 weeks gymnastic exercise were significantly decreased in the experimental group compared with the control group. The findings can be used to encourage postnatal women to perform moderate-intensity gymnastic exercise in their daily life to reduce their stress, fatigue and improve sleep quality.

Ehsani, F, et al (2020). Conducted study on stabilization exercise affects function of transverse abdominis and pelvic floor muscles in women with postpartum lumbo-pelvic pain. Lumbo-pelvic pain (LPP) is a common disorder in women after pregnancy due to ligament laxity and postural changes. Transverse abdominis (TrA) and pelvic floor muscle (PFM) activity is important for lumbo-pelvic stability. The purpose of this study was to compare the effect of stabilization exercise (SE) and general exercise (GE) on TrA and PFM muscle activity and pain intensity in women with postpartum LPP. A randomized controlled trial study was conducted on 68 women with postpartum LPP. Patients were randomly divided into two groups of stabilization exercise (SE) and general exercise (GE) and received either SE or GE exercise for 8 weeks three times a week. Ultrasound imaging was utilized to measure the thickness change of TrA muscles during abdominal hollowing (AH) and bladder base displacement. These measurements were used as an indicator of TrA and PFM muscle activity. Pain intensity, thickness changes of the TrA muscle and bladder base displacement were measured pre- and post-intervention. The results showed that there was no significant difference in pain relief after intervention between groups. The

differences in TrA and PFM activity between groups were significant ($P < 0.05$). PFM and TrA muscle activity was significantly increased after SE in women with postpartum LPP ($P < 0.05$). SE improved both PFM and TrA muscle function more than GE in women with postpartum LPP. However, the clinical outcome of pain relief was not greater in the SE group. Between the randomization groups. The NFFD prenatal combined lifestyle intervention had a significant effect on TPA-level in late pregnancy among women entering pregnancy normal-weight or physically active, there by preventing the downward trend typically seen during pregnancy. Intervention-effect among overweight / obese and physically inactive women was, however, dependent on exercise-adherence. Long-term intervention-effect was not observed in the postpartum period.

Yalfani, A., et. Al., (2020). Conducted a study on the Effect of Isometric - Isotonic Exercise of Core Stability in Women with Postpartum Diastasis Recti and its Secondary Disorders (Randomized Controlled Clinical Trial). Increasing of gap between the inter-recti abdominal muscles during pregnancy and postpartum, called diastasis recti, which is the result of weakness and transverse stretching of the line a Alba. In this disorder, lumbopelvic control is impaired, which is one of the causes of lumbar pain and disability after childbirth. One of the treatment methods for this disorder is rehabilitation training in the core area of the trunk. This study aimed to evaluate the effect of isometric-isotonic exercise on improving the width of lineaalaba, lumbopelvic control, pain and disability in women with diastasis recti after postpartum. This study is an randomized controlled double- blind clinical trial in which 24 women with diastasis recti were participated and divided into two group of exercise and control (n=12) with a mean age of 29.66 (4.97) and 28.25 (4.55), respectively. We used the digital caliper for the assessment of diastasis recti and lateral step down test for

assessment of lumbopelvic control. Also, VAS scale and Oswestry questionnaire were used for assessing pain and disability. The exercise group exercised for 8 weeks and 3 sessions per week and the control group continued their normal life routine. By comparing the mean results of the intervention and control groups after eight weeks of isometric-isotonic training, a significant difference was observed in the rate of rectus diastasis and lumbo pelvic control, pain and disability. Also, ETA squared of the effect size of exercise showed that these exercises had a very strong effect on the transverse distance of Linea Alba (0.846), the degree of pelvic lumbar control (0.850), the degree of disability (0.720), but had a moderate effect on pain variable (0.546). Isometric- isotonic exercise of core stability can improve lumbo pelvic control by reducing the width of Linea Alba and thus reduce lumbo pelvic pain and disability in people with diastasis recti. According to the result, the exercise presented in this study can be used to treat diastasis recti.

Lim, S.et al. (2020).conducted a study on an evaluation of the impact of lifestyle interventions on body weight in postpartum women: A systematic review and meta-analysis. The established efficacy in postpartum lifestyle interventions has not been translated into better outcomes. This systematic review and meta-analysis assess the penetration (the proportion of women invited within the target population), implementation (fidelity), participation (the proportion of those invited who enrolled), and effect (weight loss compared to controls) (PIPE) of randomized controlled trials of lifestyle interventions in postpartum women (within two years after birth). Medline, Embase, Pubmed, and other databases and clinical trial registries were searched up to the 3rd of May 2019. Data was extracted from published reports and missing data was obtained from study authors. The quality of the studies was appraised using the Cochrane Risk of Bias tool (2.0). Main outcomes were the PIPE impact metrics and

changes in body weight. Thirty-six trials (49 publications) were included (n=5,315 women). One study provided sufficient information to calculate the population penetration rate (2.5%). All studies provided implementation (fidelity) information, but over half had low program fidelity. The participation rate was calculated for nine studies (0.94% to 86%). There was significant change in body weight (mean difference (MD) (95% confidence interval, CI) of -2.33 (-3.10 to -1.56). This highlights the inadequacy of conventional RCTs to inform implementation. Future research should broaden methods to pragmatic trials.

Laframboise, F. et al. (2021). Conducted a study on Postpartum Exercise Intervention Targeting Diastasis Recti Abdominis. To achieve the purpose of the study effectiveness of an online, 12-week exercise intervention on diastasis recti abdominis (DRA) width and negatively associated health outcomes (i.e. weight and core function). Non-pregnant women who were 6–24 months postpartum and ≥ 18 years of age completed the study. Participants (n = 8) were randomized to intervention (exercise) or control groups; with the intervention group completing three exercise sessions per week virtually. Both groups completed three surveys at baseline, 6-weeks, and 12-weeks. DRA width was measured with nylon callipers at baseline and 12-weeks. Repeated measures analysis of covariance examined Group x Time changes in width of DRA, core function, and weight at 12-weeks; effect sizes (i.e. Cohen's d) were calculated. An alpha level of 0.05 was used to determine statistical significance. There was a significant Group x Time interaction for two DRA width measurement sites, 2 inches above navel (rest) (p = 0.007, d = 0.67) and 2 inches above navel (active) (p = 0.005, d = 0.69). The Group x Time interaction for weight approached significance (p = 0.06), with a small between group effect size (d = 0.23). The Group x Time interaction for core function was not significant (p = 0.83). Exercise interventions

delivered in a virtual setting may be effective for decreasing the severity of DRA in postpartum women. Future research should investigate the impact of similar programs on other aspects of postpartum mental and physical health, activities of daily living, and clinical practice.

Apostolopoulos, M. et al (2021) conducted a research on Influences on physical activity and screen time amongst postpartum women with heightened depressive symptoms: a qualitative study. To achieve the purpose of the study postpartum women are at higher risk of depression compared to the general population. Despite the mental health benefits an active lifestyle can provide, postpartum women engage in low physical activity and high screen time. Very little research has investigated the social ecological (i.e. individual, social and physical environmental) influences on physical activity and screen time amongst postpartum women, particularly amongst those with depressive symptoms. Therefore, this study sought to examine the influences on physical activity and screen time amongst postpartum women with heightened depressive symptoms. 20 mothers (3–9 months postpartum) participating in the Mums on the Move pilot randomised controlled trial who reported being insufficiently active and experiencing heightened depressive symptoms participated in semi-structured telephone interviews exploring their perceptions of the key influences on their physical activity and screen time across various levels of the social ecological model. Strategies for promoting physical activity and reducing screen time were explored with participants. Thematic analyses were undertaken to construct key themes from the qualitative data. Findings showed that postpartum women with depressive symptoms reported individual (i.e. sleep quality, being housebound, single income), social (i.e. childcare, social support from partner and friends) and physical environmental (i.e. weather, safety in the local

neighbourhood) influences on physical activity. Postpartum women reported individual (i.e. screen use out of habit and addiction, enjoyment) and social (i.e. positive role modelling, social isolation) influences on screen-time, but no key themes targeting the physical environmental influences were identified for screen time. Strategies suggested by women to increase physical activity included mother's physical activity groups, home-based physical activity programs and awareness-raising. Strategies to reduce screen time included the use of screen time tracker apps, increasing social connections and awareness-raising. Amongst postpartum women with heightened depressive symptoms, influences on physical activity encompassed all constructs of the social ecological model. However, screen time was only perceived to be influenced by individual and social factors. Intervention strategies targeting predominantly individual and social factors may be particularly important for this high-risk group. These findings could assist in developing targeted physical activity and screen time interventions for this cohort.

2.3. STUDIES ON PSYCHOLOGICAL EFFECTS ON POSTPARTUM WOMEN

Eustis, et al (2019). Conducted a study on Innovations in the treatment of perinatal depression: the role of yoga and physical activity interventions during pregnancy and postpartum. We review evidence for physical activity and yoga as interventions for depressed pregnant and postpartum women. Results from existing trials have generally indicated that physical activity and yoga interventions are acceptable to women during the perinatal period, and that these interventions can be effective in reducing depression. However, some studies have not found significant differences between intervention and control conditions. In addition, symptom improvements were not always maintained. The available research on physical activity and yoga as interventions for perinatal depression is encouraging with regard to

feasibility, acceptability, patient safety, and preliminary efficacy. These interventions have the ability to reach a large number of women who may not engage in traditional treatment. Additional high quality, rigorous, randomized controlled trials are needed. Future research is also needed to examine the optimal dose of these interventions and how to best increase sustained engagement.

Keshwani, et al (2019). Conducted a study on the impact of exercise therapy and abdominal binding in the management of diastasis recti abdominis in the early post-partum period. To achieve the purpose of the study pilot randomized controlled trial (RCT) design was used to compare the effectiveness of exercise therapy and/or abdominal binding to no intervention on thirty-two primiparous women who presented with DrA in the early post-partum period. Feasibility was determined based on study recruitment, compliance, and attrition rates as well as through computation of treatment effect sizes associated with each intervention compared to no intervention. Outcomes included inter-rectus distance measured using ultrasound, body image, pain, urogynecological symptoms, and function measured using questionnaires, and trunk flexion strength and endurance measured using clinical tests. The recruitment rate was 3 participants/month. Intervention adherence rates were >50% and the attrition rate was 16%. After 6 months, positive effects (Cohen's d (d) = 0.2–0.5) on body image were observed in both the abdominal binding alone and combination therapy groups. A positive effect on trunk flexion strength (d = 0.7) was observed in the combination therapy group. The effect sizes suggest that physiotherapy interventions can positively impact body image and trunk flexion strength. While a clinical trial investigating these interventions is feasible, further preliminary investigation is recommended.

Battle, et al (2020). Conducted a study on acceptability and perceived benefits of exercise among pregnant and postpartum women seeking psychiatric care. Exercise may be a potentially helpful strategy to improve mood during the perinatal period. However, little is known about the exercise behaviors and preferences of perinatal women seeking psychiatric care. This study was designed to shed light on the acceptability of exercise-based interventions for this population, and to examine the proportion of perinatal psychiatric patients who report engaging in regular exercise. Three hundred perinatal women (31% pregnant, 69% postpartum) seeking psychiatric care completed a survey assessing self-reported exercise behaviors, interest in participating in a perinatal exercise program, and perceived benefits of exercise. Respondents self-reported their presenting psychiatric symptoms and any comorbid health conditions. Fewer than 25% of women surveyed reported any recent exercise, and far less (<9%) reported activity levels consistent with current exercise recommendations. However, 87% reported interest in participating in an exercise program and viewed numerous potential benefits (improved health and energy, sense of accomplishment, better sleep, reduced stress, and less anxiety and depression). More than 65% of women reported significant medical comorbidities; these women were equally interested in exercise programs. In this preliminary study, we found that pregnant and postpartum women seeking psychiatric care reported very low levels of exercise, yet women's interest in participating in a tailored exercise program was high. Findings underscore the potential value of an exercise program for distressed perinatal women. Implementing a tailored exercise program within the context of an existing perinatal care setting could promote access and bode well for initiation and adherence.

Liu, et al (2020) conducted a study on Effects of exercise on pregnancy and postpartum fatigue. To achieve the purpose of the study fatigue is a common adverse experience in pregnant and postpartum women and is associated with poor outcomes and can seriously affect maternal and infant health and quality of life. However, data from existing studies are inconsistent, and no studies have examined the effects of exercise on pregnancy and postpartum fatigue. The aim of this review is to evaluate the effects of exercise on pregnancy and postpartum fatigue. PubMed, EMBASE, Web of Science and the Cochrane Library database were used to retrieve literature. Eligible studies were clinical trials that reported the effects of exercise on pregnancy and postpartum fatigue in women. The methodological quality of the included studies was assessed using the Cochrane Collaboration Risk of Bias Assessment Tool. A fixed-effect model was used to analyse the pooled results. Subgroup analyses were used to explore sources of heterogeneity. Sensitivity analysis was used to validate the robustness of the pooled results. Seven studies were included. The results of meta-analysis of five studies showed that exercise during pregnancy and the postpartum period may have beneficial effects on women's fatigue ([SMD = 0.29, 95 % CI (0.10, 0.47), P = 0.003]). Subgroup analyses reported that compared with the control, long exercise programmes, postpartum exercise and supervised exercise significantly improved fatigue levels. Postpartum exercise in a supervised programme lasting more than eight weeks may be beneficial for reducing postpartum fatigue. More available data from large-scale and high-quality trials are needed to demonstrate the effects of exercise on pregnant and postpartum fatigue.

Bazzazian, S. et al (2021). Conducted a research on the relationship between depression, stress, anxiety, and postpartum weight retention. To achieve the purpose of the study postpartum weight retention (PPWR) is a factor that causes permanent obesity and subsequent chronic and non-communicable diseases. The relationship between depression/stress/anxiety and PPWR has been studied in some articles, but there is no definitive conclusion in this regard. The present systematic review was conducted to investigate the relationship between depression/stress/anxiety and PPWR. An extensive search was performed in the Pub Med, Scopus, Embase, Web of Science, Google Scholar, SID, and Magiran, Irandoc databases using Medical Subject Headings terms (or their Persian synonyms) from 2000 to 2020. Inclusion and exclusion criteria were used for articles selection. The quality of the selected articles was assessed using the Newcastle–Ottawa Scale. Out of 371 reviewed articles, 24 articles were selected. The total sample size was 51,613 (range: 49–37,127). The mean of PPWR ranged from 0.5 kg (standard deviation [SD] = 6.49) to 6.4 kg (SD = 8.5). There was a statistically significant relationship between depression / stress / anxiety and PPWR in 12 of 23, 4 of 6, and 3 of 8 studies. This review demonstrates the relationship between depression / stress / anxiety and PPWR. Time of depression / stress / anxiety assessment is an important issue, as well as different measurement tools. Prevention of the mothers' psychological problems through educational and supportive programs may help to limit PPWR.

2.4 SUMMARY OF REVIEW OF RELATED LITERATURE

The investigator reviewed related literature on studies pertaining to different yogic practices on healthful living and different physical activities for the benefit of postpartum women. The review proved that there was further scope for research to find out the effect of combined and isolated yoga and resistance exercises on selected physical, physiological and psychological variables among postpartum women.

Based on the experienced, the investigator formed suitable methodology, which was presented in Chapter III.

CHAPTER - III

METHODOLOGY

In this chapter, the selection of subjects, selection of variables, orientation of subjects, reliability of instruments, competency of tester, reliability of data, test administration, experimental design and the statistical procedure used have been explained.

3.1 SELECTION OF SUBJECTS

To facilitate the study forty women who had given birth of normal delivery, at different Hospitals, Bangalore, Karnataka State who have been enrolled as subjects they had filled the concerned to take in the research voluntarily with their consent. The women were in the age group of 25 to 35 years and willing to participate in the study because of its usefulness. All the subjects who underwent postpartum training and involve in the present research were under my guidance undergoing aerobic exercise during pregnancy for the five months. The selected subjects were assigned into four groups of ten in each group such as isolated yoga, isolated resistance training and combination isolated yogic practices and isolated resistance training respectively. The fourth group served as control group which was not given any special treatment.

The requirements of the experimental procedures, testing as well as exercise schedules were explained to them so as to avoid any ambiguity of the effort required on their part and prior to the administration of the study, the investigator got the individual consent from each subject.

3.2 SELECTION OF VARIABLES

The research scholar reviewed the various scientific literature pertaining to the yogic practices and resistance training for healthful conditions of postpartum women based on their physical, physiological and psychological variables from books,

journals, periodicals, magazines and research papers. Taking into consideration of feasibility criteria, availability of instruments and the relevance of the variables of the present study, the following variables were selected.

3.2.1 DEPENDENT VARIABLES

Physical Variables

- Flexibility
- Body mass index

Physiological variables

- Mean Arterial Blood pressure
- Forced Vital Capacity
- Breath holding time

Psychological Variables

- Mood State and its sub scales Tension, Depression, Anger, Vigour, Fatigue and Confusion

3.2.2 INDEPENDENT VARIABLES

- Combined Training (isolated yogic practices and isolated resistance training)
- Isolated Yogic Practices
- Isolated Resistance Training

3.3 EXPERIMENTAL DESIGN

The study was formulated as a true random group design, consisting of a pre test and post test. The subjects (n=40) were randomly assigned to four equal groups of ten in each group. The groups were assigned as isolated yogic practices, isolated resistance training, combined training and control group respectively. Pre tests were conducted for all the subjects on selected physical, physiological and psychological variables, such as flexibility, body mass index, mean arterial blood pressure, breath

holding time forced vital capacity and mood swing consisting of six scales. The experimental groups participated in their respective experimental treatments, namely, isolated yogic practices, isolated resistance training and combined yogic practices and resistance training for period of eight weeks.

The post tests were conducted on the above said dependent variables after a period of eight weeks of experimental treatments for the groups. The difference between initial and final scores on selected criterion variables was considered as the effect of the respective experimental treatment. The obtained data was subjected to statistical treatment using ANCOVA. In all cases 0.05 level was fixed to test the hypotheses.

3.4 PILOT STUDY

A pilot study was conducted to assess the initial capacity of the subjects in order to fix the exercise load. For this purpose nine postpartum women who were not the subjects of this study were selected and administered isolated yogic practices, isolated resistance training and combined yoga and resistance exercises.

The training schedules for group isolated yogic practices, isolated resistance training and combined training were constructed based on the outcome of pilot study. However the individual differences were not considered. This enabled the investigator to adapt suitable training schedule for this study, for the isolated yogic practices, isolated resistance training and combined training.

3.5 CRITERION MEASURES

By glancing the literature, and in consultation with professional experts, the following variables were selected as the criterion measures in this study.

TABLE - I
SELECTED CRITERION VARIABLES, TESTS / TOOLS ADMINISTERED
AND THE UNIT OF MEASUREMENT

S.NO	Variables	Test/Tool Administration	Unit Of Measures
Physical Variables			
1	Flexibility	Sit and Reach	Centimeters
2	Body Mass Index	BMI	Weight/ Height meter ²
Physiological Variables			
3	Mean Arterial Blood Pressure	Sphygmomanometer test	Mm/Hg
4	Forced Vital Capacity	Spirometer	millimeter
5	Breath Holding Time	Nose and Clip method	Seconds
Psychological Variables			
6	Tension	The Brunel Scale	Numbers
7	Depression	The Brunel Scale	Numbers
8	Anger	The Brunel Scale	Numbers
9	Vigour	The Brunel Scale	Numbers
10	Fatigue	The Brunel Scale	Numbers
11	Confusion	The Brunel Scale	Numbers

3.6 RELIABILITY OF DATA

The reliability of data was ensured by establishing the instrument reliability, tester's competency and subject reliability

3.6.1 Tester's Competency

Reliability was established by the test-retest processes. Nine post partum women from all the three experimental groups were tested on selected criterion variables. The repeated measurement of individuals on the same test is done to determine reliability. It is a univariate not a bivariate situation, it makes sense then to use a univariate statistics like the intraclass correlation coefficient (**Baumgartner and Jackson, 1975**).

The intra class correlation coefficient obtained for test-retest data are presented in Table II.

TABLE II
INTRA CLASS CORRELATION COEFFICIENT VALUES ON SELECTED
CRITERION VARIABLES

S.NO	CRITERION VARIABLES	COEFFICIENT OF CORRELATION
Physical Variables		
1	Flexibility	0.85*
2	Body Mass Index	0.62*
Physiological Variables		
3	Mean Arterial Blood Pressure	0.75*
4	Forced Vital Capacity	0.72*
5	Breath Holding Time	0.89*
Psychological Variables - Mood Swing Subscales		
6	Tension	0.68*
7	Depression	0.71*
8	Anger	0.75*
9	Vigour	0.73*
10	Fatigue	0.81*
11	Confusion	0.79*

* Significant at 0.05 level of confidence. Table value 0.602 with the df (N-1) = 9.

3.6.2 SUBJECT'S RELIABILITY

The intra class correlation value of the above test and retest also indicated subject reliability as the same subjects were used under similar conditions by the same tester. The co-efficient of reliability were significant at 0.05 level, for the above test under investigation.

3.6.3 Reliability of Equipment

Stop watches calibrated to one tenth of a second were used in this study for recording the timings and this stop watch times were compared with other watches in different situations and they were considered reliable. The laboratory equipments sphygmomanometer, stethoscope, stadiometer, weighing scale, measuring steel tape

and spirometer were obtained from leading laboratories and were found reliable. Thus all the instruments used were standard and therefore their calibrations were accepted accurate enough for the purpose of the study.

3.1.1 Orientation of the Subjects

Before the commencement of training programme, the investigator explained the subjects, the purpose of the training programme and their role in the investigation. A period of two days consisting of four sessions, were used to teach the procedure of yoga training and resistance training. The subjects were motivated to attend the practice sessions regularly. All the subjects were motivated to perform to their maximum level during the training sessions and the testing periods.

3.2 TRAININGPROGRAMME

Experimental Group I was given isolated yogic practices, experimental group II was given resistance training and experimental group III was given combination of yogic practices and resistance exercises. The details of the training programme for experimental groups are given below.

3.2.1 TRAINING SCHEDULE FOR ISOLATED YOGICPRACTICES

The training programme was given to isolated yogic practices, 3 days (Tuesday, Thursday & Saturday) in a week, for 8 weeks. The eight weeks training schedule for isolated yogic practices was starts from 8am to 9am with a total period of 35minutes to maximum of 60minutes presented in Tables III, IV, V and VI.

TABLE III
DESCRIPTION OF TRAINING SCHEDULE FOR ISOLATED YOGIC PRACTICES FOR I TO II WEEKS

ASANAS	REPETITION OR ROUND	NO OF SET	DURATION
Loosening Exercises	One Round	2 set	35 min
Suryanamaskar	Two Round		
Ardha Padmasana-Half lotus posture	5 to 10 times		
Vrikshasana-Tree Posture	Two Round		
Shashankasana-Hare Posture	Two Round		
Paschimotasana-Back-Stretching Posture	Two Times		
Ardha Chakrasana-Half Wheel Posture	One Time		
Naukasana – Boat Pose	One Time		
Pranayama (Nadi Shodhana Pranayama)	10		
Meditation	5		
Savasana	10		

TABLE IV
DESCRIPTION OF TRAINING SCHEDULE FOR ISOLATED YOGIC PRACTICES FOR III TO IV WEEKS

ASANAS	REPETITION OR ROUND	NO OF SET	Duration
Loosening Exercises	Two Round	4	40 min
Suryanamaskar	One Round		
Vrikshasana-Tree Posture	Two Round		
Shashankasana-Hare Posture	Two Round		
Paschimotasana-Back-Stretching Posture	Three Times		
Tadasana-Mountain Posture	Two Round		
Ardhakatichakrasana-Lateral Arc Posture	Two Round		
Naukasana – Boat Pose	One Time		
Pranayama (Nadi Shodhana Pranayama)	10		
Meditation	5		
Savasana	10		

TABLE V
DESCRIPTION OF TRAINING SCHEDULE FOR ISOLATED YOGIC PRACTICES FOR V TO VI WEEKS

ASANAS	REPETITION OR ROUND	NO OF SET	Duration
Loosening Exercises	Two Round	6	50 Min
Suryanamaskar	Two Round		
Vrikshasana-Tree Posture	Two Round		
Shashankasana-Hare Posture	Two Round		
Paschimotasana-Back-Stretching Posture	Three Times		
Tadasana-Mountain Posture	One Round		
Ardhakatichakrasana-Lateral Arc Posture	Two Round		
Padhasthasana	Two Time		
ArdhaChakrasana-Half Wheel Posture	Two Time		
Naukasana – Boat Pose	One Time		
Shalabasana	5 to 7 Time		
Pranayama (Nadi Shodhana Pranayama)	10		
Meditation	5		
Savasana	10		

TABLE VI
DESCRIPTION OF TRAINING SCHEDULE FOR ISOLATED YOGIC PRACTICES FOR VII TO VIII WEEKS

ASANAS	REPETITION OR ROUND	NO OF SET	Duration
Loosening Exercises	Two Round	8	60 Min
Suryanamaskar	Three Round		
Savasana			
Vrikshasana-Tree Posture	Three Round		
Shashankasana-Hare Posture	Two Round		
Paschimotasana-Back-Stretching Posture	Three Times		
Tadasana-Mountain Posture	Two Round		
Ardhakatichakrasana-Lateral Arc Posture	Two Round		
Padhasthasana	Two Time		
ArdhaChakrasana-Half Wheel Posture	Three Time		
Naukasana – Boat Pose	Two Time		
Shalabasana	7 to 9 Time		
Pranayama (Nadi Shodhana Pranayama)	10		
Meditation	5		
Savasana	10		

3.8 TRAINING SCHEDULE FOR ISOLATED RESISTANCE TRAINING

Facilities Required

Mats and stopwatches were used.

Instructions

The subjects were explained about the procedure of the test and need for assessment. Also the subjects were given a chance to practice the prescribed test. The subjects were instructed to raise the hand, when they feel an undue discomfort in the chest or feeling of dizziness.

Each day programme lasted for a total period of 35 minutes including assembly and dispersal in first four weeks, which was increased to 60 minutes including assembly and dispersal during fifth to eighth week. The training programme was given to isolated resistance practices, 3 days in a week, for 8 weeks. The eight weeks training schedule for isolated resistance training was presented in Tables VII, VIII, IX and X.

TABLE VII

DESCRIPTION OF TRAINING SCHEDULE FOR ISOLATED RESISTANCE TRAINING PRACTICES FOR I TO II WEEKS

Resistance Exercises	Intensity	Repetition	Rest between Set	Repetition between exercise	Set Rest	Total Duration
Warming up	50 to 55%	6 - 8	2	30 Sec	1 - 2 min	35 min
Modified Push Ups						
Seated Hip Bridge – Pelvic Bridge						
Bird and Dog						
Squats						
Lunges						
Heel raise						
Situps						
Plank						
Warm down slow walking						

TABLE VIII

DESCRIPTION OF TRAINING SCHEDULE FOR ISOLATED RESISTANCE PRACTICES FOR III TO IV WEEKS

Resistance Exercises	Intensity	Repetition	Rest between Set	Repetition between exercise	Set Rest	Total Duration
Warming up	55 to 65%	8 -10	4	40 Sec	1 - 2 min	40 min
Modified Push Ups						
Seated Hip Bridge – Pelvic Bridge						
Bird and Dog						
Squats						
Lunges						
Heel raise						
Situps						
Plank						
Warm down slow walking						

TABLE IX

DESCRIPTION OF TRAINING SCHEDULE FOR ISOLATED RESISTANCE PRACTICES FOR V TO VI WEEKS

Resistance Exercises	Intensity	Repetition	Rest between Set	Repetition between exercise	Set Rest	Total Duration
Warming up	65 to 75%	8 -10	6	40 Sec	1 - 2 min	50 min
Modified Push Ups						
Seated Hip Bridge – Pelvic Bridge						
Bird and Dog						
Squats						
Lunges						
Heel raise						
Situps						
Plank						
Warm down slow walking						

TABLE X

DESCRIPTION OF TRAINING SCHEDULE FOR ISOLATED RESISTANCE PRACTICES FOR VII TO VIII WEEKS

Resistance Exercises	Intensity	Repetition	Rest between Set	Repetition between exercise	Set Rest	Total Duration
Warming up	75 to 80%	10 - 12	8	40 Sec	1 - 2 min	60 min
Modified Push Ups						
Seated Hip Bridge – Pelvic Bridge						
Bird and Dog						
Squats						
Lunges						
Heel raise						
Situps						
Plank						
Warm down slow walking						

3.9 TRAINING SCHEDULE FOR COMBINED TRAINING

The subjects were assembled in a common place, which has adequate space for training programme. For the combined training of isolated yogic practices and isolated resistance training were given alternate days on Monday, Wednesday and Friday for eight weeks. The training programme was given to in table XI, XII, XIII and XIV

TABLE - XI

DESCRIPTION OF TRAINING SCHEDULE FOR COMBINED TRAINING FOR I TO II WEEKS

No. of Week	Days	Training	Table No
1 Week	Monday	Yogic Practice	III
1 Week	Wednesday	Resistance Training	VII
1 Week	Friday	Yogic Practice	III
2 Week	Monday	Resistance Training	VII
2 Week	Wednesday	Yogic Practice	III
2 Week	Friday	Resistance Training	VII

TABLE - XII**DESCRIPTION OF TRAINING SCHEDULE FOR COMBINED TRAINING
FOR III TO IV WEEKS**

No. of Week	Days	Training	Table No
3 Week	Monday	Yogic Practice	IV
3 Week	Wednesday	Resistance Training	VIII
3 Week	Friday	Yogic Practice	IV
4 Week	Monday	Resistance Training	VIII
4 Week	Wednesday	Yogic Practice	IV
4 Week	Friday	Resistance Training	VIII

TABLE - XIII**DESCRIPTION OF TRAINING SCHEDULE FOR COMBINED TRAINING
FOR V TO VI WEEKS**

No. of Week	Days	Training	Table No
5 Week	Monday	Yogic Practice	V
5 Week	Wednesday	Resistance Training	IX
5 Week	Friday	Yogic Practice	V
6 Week	Monday	Resistance Training	IX
6 Week	Wednesday	Yogic Practice	V
6 Week	Friday	Resistance Training	IX

TABLE - XIV**DESCRIPTION OF TRAINING SCHEDULE FOR COMBINED TRAINING
FOR VII TO VIII WEEKS**

No. of Week	Days	Training	Table No
7 Week	Monday	Yogic Practice	VI
7 Week	Wednesday	Resistance Training	X
7 Week	Friday	Yogic Practice	VI
8 Week	Monday	Resistance Training	X
8 Week	Wednesday	Yogic Practice	VI
8 Week	Friday	Resistance Training	X

3.10 DESCRIPTION OF YOGIC PRACTICES AND RESISTANCE EXERCISES

3.10.1 NECK MOVEMENTS – KANTHASANCHALANA

- The subjects asked to stand in Tadasana Position;
- Kept the neck straight, then slowly but without jerk.
- Start rotating neck clockwise from left shoulder to backwards then to the right shoulder and to front.
- Repeat this in anticlockwise direction starting from right shoulder

3.10.2 SHOULDER MOVEMENTS –SKANDHASANCHALANA

- The subjects asked to sit in the Vajrasana Position,
- Kept the body straight, with arms by side.
- Then slowly but without jerk lift both shoulders upwards as much as possible near to ears, back to normal position.
- Fold the hands and place left fist on left shoulder and right fist on right shoulder, bring both elbows together near chest, then slowly but without jerk.

3.10.3 HAND MOVEMENTS –HASTASANCHALANA

- The subjects asked to relax in Shavasana position,
- Kept the hands 6 inches away from the body,
- Legs separated with 12 inch distance between them,
- Lift the hands 1 to 1.5 inch above ground and slowly rotate them towards head without bending elbows,
- Kept the hands parallel to the ground till both the palms meet, place left palm on right palm and stretch hands upwards and legs downwards for 5 to 10 seconds, then slowly but without jerk rotate both the hands back to the normal position via the same path.

3.10.4 LEG MOVEMENTS – PADASANCHALAN

- The subjects asked to relax in Supine position,
- Kept the hands around head rotating them sideways,
- Then lift the left leg and bring it near to the hip,
- Repeat this procedure for the right leg.
- Then slowly bring both the hands back to the normal position.

3.10.5 KNEE: MOVEMENT - JANUSANCHALAN

- The subjects asked to relax in Supine position,
- Moved the hands around head
- Then bend left leg in knee and rest foot near to hips,
- Then turned the knee to the right side as far as possible.
- Repeat this procedure for the right leg.
- Then slowly bring both the hands back to the normal position.

3.10.6 SURYA NAMASKAR-SUN SALUTATION

Step 1 - Hastauthanasana

- Subjects were asked to stand erect with the legs together and palms together.
Take the hands above the head and bend the trunk backwards.
- Chant Manthra: Aum Hram Mitraya Namah
- Breathing: Inhaled

Step 2 - Padahasthasana

- Subjects were asked to bend the body to the front and touch the knees by the forehead. Kept the palms on the floor on either side of the legs.
- Chant Manthra: Aum Hrim Ravaye Namah
- Breathing: Exhaled

Step 3 - Asvasanchala

- Subjects were asked to kick the right leg back, take the left knee forward, look up and inhaled. Press the buttock closed to the heel.
- Chant Manthra: Aum Hrum Suryaya Namah
- Breathing: Inhaled

Step 4 - Danadal

- Subjects were asked to take the left leg also back, resting only on palms and toes; kept the body straight from head to toes inclined to the ground.
- Chant Manthra: Aum Hraim Bhanave Namah
- Breathing: Exhaled

Step 5 - Sasangasana

- Subjects were asked to bend at the knee and rest on the floor without altering the position of the palms and toes. Rest the forehead on the ground.
- Chant Manthra: Aum Hroum Khagaya Namah
- Breathing: Inhaled and Exhaled

Step 6 - Astanaganamaskar

- Subjects were asked to moving without the hands and toes, come forward on the chest and rest the chin. In this position sastanga namaskara, forehead, chest, palms, knees and feet are the eight organs that would be touching the ground. The buttocks would be raised up.
- Chant Manthra: Aum Hrah Pushne Namah
- Breathing: Bahyakumbhaka

Step 7 - Bhujanagasana

- The subjects asked to raised the head and trunk making the spine concave upwards without changing the position of the hands and feet. Kept the knees on the ground.
- Chant Manthra: Aum Hram Hiranyagarbhaya Namah
- Breathing: Inhaled

Step 8 - Parvatasana

- The subjects asked to raised the buttocks, push the head down and have a complete arch with the heels touching the ground and palms on the floor.
- Chant Manthra: Aum Hrim Maricaye Namah
- Breathing: Exhaled

Step 9 - Sasangasana

- Subjects were asked to bend at the knee and rest on the floor without altering the position of the palms and toes. Rest the forehead on the ground.
- Chant Manthra: Aum Hrum Adityaya Namah
- Breathing: Inhaled and Exhaled

Step 10 - Asvasanchala

- Subjects were asked to inhaled and bring the right leg in between the two hands and in line with them. Arch the back concave upwards as in position 3.
Chant Manthra: Aum Hraim Savitre Namah
- Breathing: Inhaled

Step 11 - Padahasthasana

- The subjects asked to exhaled and bring the left foot forward next to the right foot and touch the knees with forehead as in position 2.
- Chant Manthra: Aum Hroum Arkaya Namah

- Breathing: Exhaled

Step 12 - Hastautthanasana

- The subjects asked to come up, stand erect with hands along the body and relax.
- Chant Mantra: Aum Hrah Bhaskaraya Namah, Breathing: Inhaled

3.10.7 ASANAS

3.10.8 ARDHA PADMASANA – HALF LOTUS POSTURE

- The subjects asked to start pose - Dandasana, bend the right knee and bring the right ankle to the left hip crease with the sole of the right foot facing upwards.
- Settled the foot into the hip crease.
- Bend the left knee and cross the left ankle under the right hip knee in a comfortable, cross-legged position.

3.10.9 VAKRASANA -SITTING SIDEWARD TWIST POSTURE

- The subjects asked to sit in danadasana.
- Bend the left leg in the knee and place it near the thigh of left leg.
- Placed the right hand beyond the folded knee of the left leg and in front of the left hand. Kept the palms of both the hands in opposite direction. There should be a distance of one foot between the two hands.
- Press the standing left knee with the right hand and shoulders and twist the neck to the left. Turn the sight also in the same direction and continue normal breathing.

3.10.10 SHASHANKASANA -HARE POSTURE

- The subjects asked to sit in Vajrasana.
- Inhaled and raised the hands slowly above the shoulder.

- Exhaled and slowly bend forward and try to place the head on the floor and resting the hands from elbow onwards on the floor.
- Stay for 20 to 30 breath counts and then come back to original position slowly with exhalation.

3.10.11 PASCHIMOTHANASANA - BACK-STRETCHING POSTURE

- The subjects asked to sit in dandasana with legs stretched and heels together. Back, neck and head should be held straight. Bring both the hands with the palms down, parallel to the legs.
- Inhaled and proceed towards the toes and try to touch.
- Exhaled and slowly bring the head down in between the hands; stretch out the hands, toes and head.
- Inhaled and return to the first position.

3.10.12 TADASANA - MOUNTAIN POSTURE

- The subjects asked to stand with both feet touching from the heel to the big toe, kept the back straight and the arms pressed slightly against the sides with palms facing inward.
- Slightly tighten or flex the muscles in the knees, thighs, stomach and buttocks maintained a firm posture. Balance the weight evenly on both feet.
- Inhale through the nostrils and lift the buttocks off the legs arching the back and thrusting the abdomen forward and tilt the head as far back as possible.

3.10.13 ARDHAKATICHAKRASANA - LATERAL ARC POSTURE

- The subjects asked to stand erect with feet close together, hands along the thighs, fingers stretched out.
- While inhaling, slowly raise the right arm sideways up above the head until the arm touches the ear, palm facing left.

- Bend slowly on the left-side; slide the left palm down as far as possible along the left leg. Exhale as you bend. Raised hand should not bend at the elbow. Knee straight. Breathe normally. Maintain for about a minute.
- Return to position 2 inhaled completely. Bring the hand down to 1st position.
- Repeat on the left side, by bending towards the right.

3.10.14 PADAHASTHASANA

- The subjects asked to stand erect. Kept the arms by the sides. Keep the heels close together. Keep some gap between the feet.
- Raised both the arms. Slowly bend forward at the waist. Kept the knees stiff and firm. The legs should not bend at the knees.
- Kept the palms under the feet.
- Slowly exhale - while bending low and contract the stomach. Put forehead between the knees. Hold this position for two to ten seconds.

3.10.15 ARDHA CHAKRASANA - HALF WHEEL POSTURE

- The subjects asked to dandasana.
- Placed the hands on waist, Inhale and bend back, fixing the eyes on an object behind, like a picture on the wall.
- Stay for as long, exhale and bend forward.

3.10.16 VRIKSHASANA - TREE POSTURE

- The subjects asked to stand with the feet together and the arms by the sides.
- Bend the right leg at the knee, raise the right thigh and bring the sole of the right foot as high up the inside of the left thigh as possible.
- Balanced on the left foot, raise both arms over the head keeping the elbows unbent and joining the palms together. Hold the posture while breathing gently through the nostrils for about 10 complete breaths.

- Lower the arms and right leg and return to the tadasana, standing position with feet together and arms at the sides. Pause for a few moments and repeat on the opposite leg.

The following yogic practices were given for experimental group II.

3.10.17 MODIFIED PUSH UPS

- The subjects asked to start in drop the knees with hands under shoulders, feet slightly wider than hip-width apart.
- Lowered chest down until it's in line with elbows, which should be pointing backward at about 45 degrees.
- Press away from the floor to return to starting position.

3.10.18 SEATED HIP BRIDGE – PELVIC BRIDGE

- The subjects asked to sit with feet flat on the floor in front of hips, with knees pointing toward the ceiling. Press palms flat into the floor just behind hips, fingers pointing toward heels.
- Press into hands and feet to lift hips up to knee height, keeping head in a neutral position, looking up toward the ceiling at the top.
- Slowly lower to return to starting position.

3.10.19 BIRD AND DOG (MODIFIED)

- The subjects asked to start in tabletop position on all fours with a flat back, shoulders over wrists, and knees directly under hips. Kept neck in a neutral position.
- Simultaneously lift right arm and extend forward, biceps next to ear, and lift left leg straight backward.
- Return to starting position, then repeat on the other side. Continue alternating.

3.10.20 SQUATS

- The subjects asked to stand with feet parallel, feet slightly wider than hip-width apart and knee slightly bend.
- Point the toes slightly outward. Tilt the pelvic.
- Squat down until thighs were at least parallel to the floor. Try not to extend the knees past the toes.
- Don't arch back. Return to the starting position and repeated for the required number of repetitions

3.10.21 SCAPULAR PUSH UPS

- The subject asked to lie on the exercise mat or floor with the elbows close to the sides and directly under the shoulders, palms down and fingers facing forward.
- Engaged the core muscles.
- Contract the thigh muscles to straighten the legs strongly and flex the ankles.
- Then slowly down the torso towards the floor and slowly came back to the normal position and repeated for the required number of repetitions.

3.10.22 LUNGES

- The subjects asked to stand with feet hip width the part. Taken left leg and step back approximately 2 feet standing.
- Feet should be positioned at a staggered stance with head and back erect and straight in a neutral position.
- Lowered body by bending at hip and knee until thigh was parallel to floor. Body should follow a straight line down towards the floor.
- Return to start position and repeat by reaching to opposite side for the required number of repetitions.

3.10.23 HEEL RAISE

- The subjects asked to stand erect with palm facing forward, hands wider than shoulder width apart and bar resting behind the neck on shoulders.
- The subjects were instructed to stand with heels apart and then they raise the body on their toes quickly holding the position for one second.

3.10.24 SUMO SQUAT

- The subjects asked to stand with the feet apart, toes pointed slightly outward. Sink straight down into wide-legged squat.
- Make sure to engage the core to prevent putting too much pressure in the lower back.
- At the same time, pulled the band apart in front of the, so the arms are in a T-shape. Come back to the starting position and then repeat.

3.10.25 SIDE LYING LEG RAISE

- Lied on one side with lower arm on the floor and upper hand in front of the body for support.
- Braced the abdomen, bring the bottom leg slightly in front of top leg, letting the inside of top foot rest on the ground. Then lifted the upper leg up to the ceiling, kept the hips stacked. Pause and then lower the leg. Come back to the starting position and then repeat.

3.11 TEST ADMINISTRATION

3.11.1 FLEXIBILITY (Sit and Reach Test)

Purpose

To estimate the trunk flexibility

Equipments

Meter and measuring steel tape

Procedure

Place the yardstick on the floor and put a 45 cm piece of tape across the 35 cm mark on the meter stick. The tape should secure the yardstick to the floor. The subject sits with the O end of the yardstick between the legs. The subject heel should almost touch the tape at the 35 cm mark and be about 12 inch apart with the legs held straight. The subject bends forward slowly and reaches with parallel hand as far as possible and touches the meter stick. The subject should hold this reach long enough for the distance to be recorded.

Scoring

Perform three trials. The best score recorded in centimeters.

3.11.2 BODY MASS INDEX**3.11.2.1 Height****Objective**

To measure height

Apparatus used

Stadiometer and Anthropometric rod

Test Description

Height will be measured by anthropometric rod. The subject stand erect bare footed on a plane horizontal surface against a wall with her heels, back of the shoulder and head touching the wall and stretch the body. Stretched upwards as much as possible without her heel leaving the ground. Than anthropometric rod is kept in front of the subject and the crossbar of the anthropometry is adjusted so that the lower edge touches the highest point of the subject's head. Height will be recorded in meters.

3.11.2.2 Weight

Objective

To measure weight

Apparatus used

Weighing Machine

Test Description

The weights of the subjects were taken on a weighing machine with the subjects wearing short and vest only. They stood on the weighing machine and weight was recorded nearest to half a kilogram (**Yobu, 1983**).

3.11.2.3 Calculation of Body Mass Index

From the height and weight obtained following above procedures, body mass index of each subject was calculated. Body mass index was calculated by dividing the subject's body weight in kilogram by their height in meters squared (**Palanivel, 2004**).

3.11.3 MEAN ARTERIAL BLOOD PRESSURE

Purpose

The purpose of this test was to measure mean arterial blood pressure at rest.

Equipment

Sphygmomanometer and stethoscope.

Procedure

A sphygmomanometer and a stethoscope were used to measure blood pressure (systolic and diastolic). The population were asked to be in sitting position through out the study.

The left upper arm of the population was encircled by an inflatable rubber bag which was connected to pressure pump and manometer. By pumping air, the pressure

in the bag was rapidly raised approximately to 200 mmHg. Which was sufficient to completely obliterate the brachial artery so that no blood comes through and the radial pulse disappeared. The pressure was then lowered to a point where the pulse could be felt by using a stethoscope, pulsating of the brachial artery at the bend of the elbow could be distinctly heard. At this particular point pressure shown on the dial was considered to be the systolic pressure. The pressure on the brachial artery was then gradually reduced until the arterial pulse rate beats could be distinctly heard and particular point at which the sound disappeared was taken as the diastolic pressure. Then these 2 measures put into the calculation, that is, mean arterial blood pressure, using the formula as suggested by **Fox and Mathews (1981)**.

$$\text{MAP} = \frac{(2 \times \text{Diastolic Pressure}) + \text{Systolic Blood Pressure}}{3}$$

3.11.4 BREATH HOLDING TIME

Objective

The purpose of this test was to measure the breath holding time.

Equipments

For recording the breath holding time, a stop watch (1/10th of second) and nose clip were used.

Administration

The subject was instructed to stand at ease and to inhale deeply after which he holds his breath for a length of time possible by him. A nose clip was placed on nose to avoid letting the air through nostrils. The duration from the time of holding his breath until the movement he let air out was clocked by using the stop watch to the nearest one tenth of a second as breath holding time. The co-operation of the subject to let out the air by opening the mouth was sought to clock the exact breath holding time.

Scoring

The time is recorded in seconds and the beset of two trials were recorded

3.11.5 FORCED VITAL CAPACITY**Purpose**

Determination of forced vital capacity

Equipments

Spiro meter, chair and nose clips

Test Description

The vital capacity of the subject was determined by the Spiro meter in sitting position. The subject was allowed to inspire the maximum amount of air voluntarily and then he was asked to blow into the dry Spiro meter to the maximum extent while taking the test the nose of the subject was clipped using a nose clip.

Scoring

The vital capacity of the subject was obtained from the movement of circular volume indicator which was set at '0' before the vital capacity measure was taken. The result was recorded in milliliter.

3.11.6 MOOD STATE

The questionnaire on mood state and self esteem were administered and the response sheets were collected prior to the training programme and the same questionnaire was administered after eight weeks training programme.

The objectives of the tests were explained to the subjects and they were asked to respond to each statement as quickly as possible and truthfully. As soon as they complete the test, the response sheets were collected by the investigator. The investigator had informed the subjects that any doubt or meaning for the words in questionnaire could be asked while answering the questionnaire.

Scoring of Mood State

The questionnaire on mood state consists of 27 objectives with a five points rating scale, viz, 0 (not at all); 1 (a little), 2 (moderate), 3 (quite a bit) and 4 (extremely).

The test has six subscales and was scored by computing a separate total for each of the 6 subscales with scores ranging from a low of 0 to a high of 16 in the factors of Confusion, Tension and Vigour and 20 in the factors of anger, Depression and Fatigue. The subscales were as follows:

1. The Tension – Anxiety (T) subscale was scored by totaling the responses for the items: 1, 15, 16 and 20.
2. The Depression – Dejection (D) subscale is scored by adding the responses to the 5 items: 2, 7, 8, 14 and 18.
3. The Anger – Hostility (A) subscale was scored by adding the responses for the 5 items: 5, 9, 13, 21 and 24.
4. The Vigour – Activity (V) subscale was scored by adding the responses to the items : 3, 17, 22 and 26.
5. The Fatigue – Inertia (FA) Subscales was scored by adding the responses for the items 6, 10, 12, 23 and 25.
6. The Confusion – Bewilderment (C) subscale was scored by totaling the responses to the items: 4, 11, 19 and 27.

3.12 COLLECTION OF DATA

The purpose of the study was to estimate the effects of combined and isolated yoga and resistance training among postpartum women on selected physical fitness, physiological and psychological variables. For this purpose, the research scholar followed the following procedure

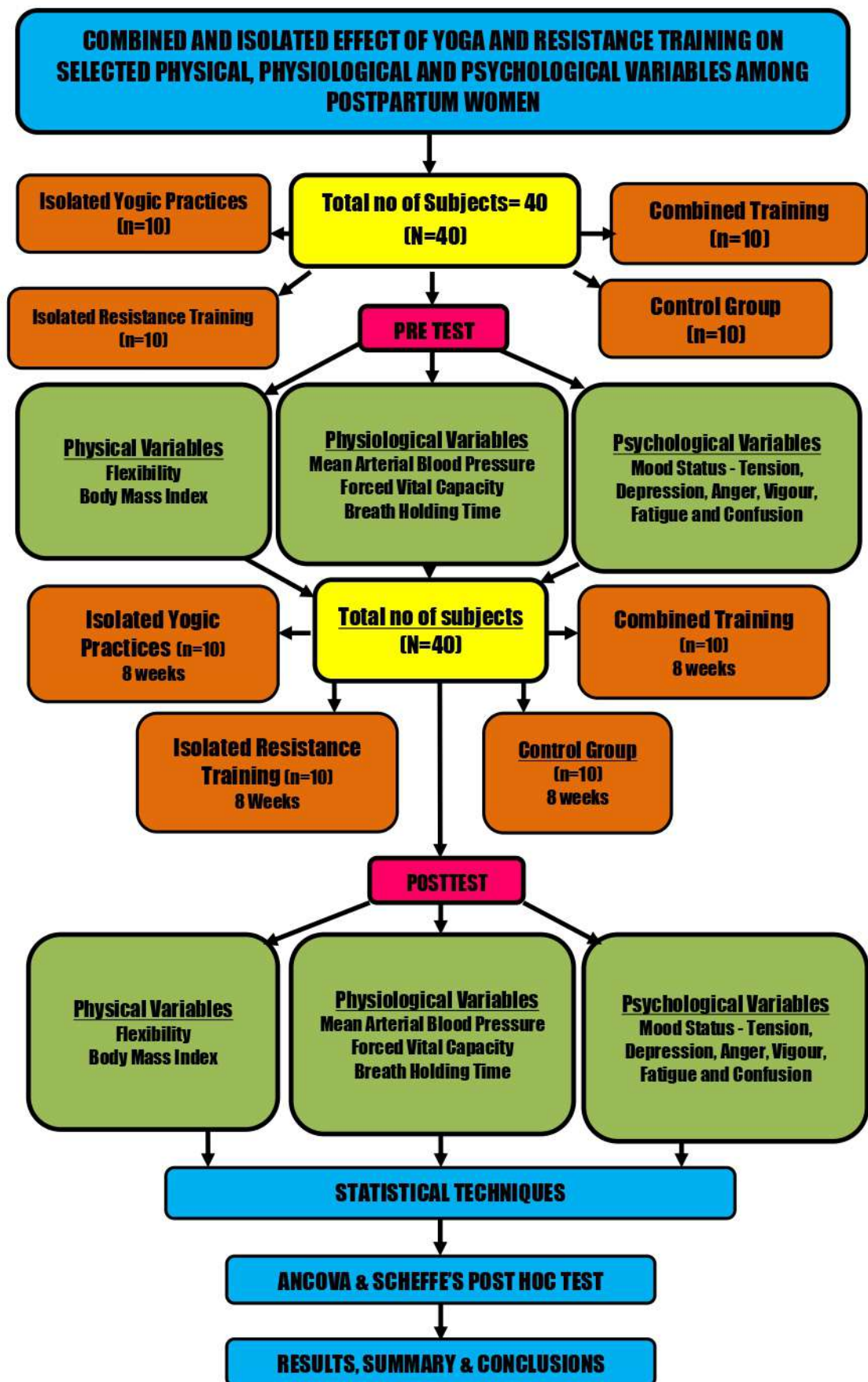
The subjects of the study were selected at random and divided into four groups. Among the four groups, the control group was strictly under control, without undergoing any special activity. The experimental groups were undergone with the respective experimental treatments.

The experimental groups were well acquainted with their allotted techniques and did only the experimental treatment given to them for a period of eight weeks under the personal supervision of the researcher.

3.13 STATISTICAL PROCEDURES

The data were analyzed by using Analysis of Covariance (ANCOVA) as recommended by **Clarke and Clarke (1972)** and **Best and Khan (1986)**. In all the cases 0.05 level was fixed as level of significance which was considered as appropriate. Since, four groups were compared, whenever obtained 'F' ratio for the adjusted post test was found to be significant, the Scheffe's test was applied as post hoc test to find out the paired mean differences, if any. In all cases, 0.05 level was fixed as level of confidence to test the significance which was considered as appropriate.

3.14 FLOW CHART SHOWING THE METHODOLOGY



CHAPTER - IV

RESULTS AND DISCUSSIONS

4.1 OVERVIEW

This chapter deals with the analysis of data collected from the subjects under study. The subjects divided into four equal groups namely isolated yogic practices, isolated resistance training and combined training (combination of isolated yogic practices and isolated resistance training) and group IV acted as Control Group were analyzed with the difference of selected physical fitness variables such as abdominal strength, flexibility and body mass index; physiological variables such as mean arterial blood pressure, forced vital capacity and breath holding time; psychological variables such as Mood State and its sub scales Tension, Depression, Anger, Vigour, Fatigue and Confusion, responds to combined and isolated of yoga and resistance training in relation pre test, post test and adjusted post test score.

The subjects were selected at randomly but the groups were not equated in relation to the factors that have been examined. Hence, the difference among the means of the four groups in pre test had to be taken into account during the analysis of the post test differences among the means. This was achieved by the application of analysis of covariance, where the final means were adjusted for difference to the initial and adjusted means were tested for significance. When the adjusted post test means were significant, the Scheffe's Post Hoc test was administrated to find out the paired means significant differences.

4.2 TEST OF SIGNIFICANCE

This was the critical portions of the discussion in arriving at the conclusion by examining the hypotheses. This procedure of testing the hypotheses were in accordance with the results obtained in relation to the level of confidence, which was

fixed at 0.05 levels, which was considered necessary for this study. These tests were usually called the test of significance, as we test whether the difference between the pre test and post test score of the sample were significance or not. In the present study, if obtained 'F' ratio was greater than the table 'F' ratio at 0.05 level, the hypotheses was accepted to the effect that there existed significant difference between the means of the groups compared. If obtained 'F' ratio was lesser than the table 'F' ratio at 0.05 level, the hypotheses was rejected to the effect that there existed no significant difference between means of the groups on this study.

4.3 LEVEL OF SIGNIFICANCE

The probability level below which we reject the hypotheses were termed as the level of significance. The 'F' ratio obtained by the analysis of covariance needed 2.87 significant at 0.05 level. In additional to that, the significant confidence interval value, utilizing the Scheffe's Post Hoc test, in which the obtained mean difference value needed to be greater than the Scheffe's confidence interval value for significance.

4.4 COMPUTATION OF ANALYSIS OF COVARIANCE OF FLEXIBILITY

The following tables illustrated the statistical results to the combined, isolated yogic practices and isolated resistance training on flexibility among postpartum women and ordered adjusted means the groups under study.

TABLE IX
COMPUTATION OF ANALYSIS OF COVARIANCE ON FLEXIBILITY
(Scores in centimeter)

Means	IYP	IRT	CT	Control Group	SV	SS	df	MS	Obtained 'F'
Pre test	2.50	2.70	2.80	3.10	B	1.88	3	0.63	0.90
					W	25.10	36	0.70	
Post test	5.80	4.90	7	3.80	B	55.28	3	18.43	23.60*
					W	28.10	36	0.78	
Adjusted post test	5.97	4.95	6.98	3.59	B	61.36	3	20.45	39.71*
					W	18.03	35	0.52	

*Significant. F ratio for 3 and 36 = 2.87 and 3 and 35 = 2.87 (0.05 level)

4.4.1 RESULTS OF FLEXIBILITY

Table IX shows analyzed data on flexibility. The pre test means of flexibility were 2.50 for isolated yogic practices, 2.70 for isolated resistance training, 2.80 for combined training and 3.10 for Control Group. The obtained 'F' ratio 0.90 was lesser than the table 'F' ratio 2.87. Hence, the pre test was not significant at 0.05 level of confidence for degrees of freedom 3 and 36. This proved that there was no significant difference between experimental and control groups indicating that the process of randomization of the groups was perfect while assigning the subjects to groups.

The post test means were 5.80 for isolated yogic practices, 4.90 for isolated resistance training, 7 for combined training and 3.80 for Control Group. The obtained 'F' ratio 23.60 was higher than the table 'F' ratio 2.87. Hence, post test was significant at 0.05 level of confidence for the degrees of freedom 3 and 36. This proved that the differences among the post test means of the groups were significant.

The adjusted post test means were 5.97 for isolated yogic practices, 4.95 for isolated resistance training, 6.98 for combined training and 3.59 for Control Group. The obtained 'F' ratio 39.71 was higher than the table 'F' ratio 2.87. Hence, adjusted post test was significant at 0.05 level for the degrees of freedom 3 and 35. This proved that there was significant difference among means due to the combined and isolated of yoga and resistance training on flexibility. To find out the paired mean difference between groups, Scheffe's Post Hoc test was applied. The outcome of the subsequent test is represented in the table - X.

TABLE X
COMPUTATION OF SCHEFFE'S POST HOC TEST ORDERED ADJUSTED
FINAL MEAN DIFFERENCE OF FLEXIBILITY
 (Scores in centimeter)

Control Group	Isolated Yogic Practices	Isolated Resistance Training	Combined Training	MD	CI
3.59	5.97	-	-	2.38*	0.94
3.59	-	4.95	-	1.36*	0.94
3.59	-	-	6.98	3.39*	0.94
-	5.97	4.95	-	1.02*	0.94
-	5.97	-	6.98	1.01*	0.94
-	-	4.95	6.98	2.03*	0.94

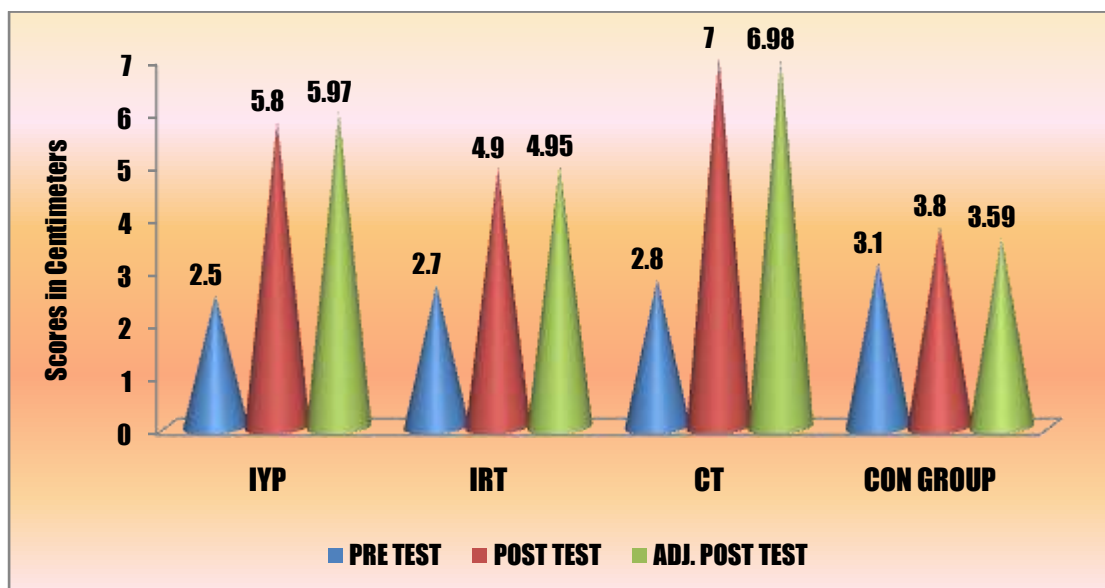
* Significant at 0.05 level.

Table X shows the Scheffe's Post Hoc Test of ordered adjusted final means difference of flexibility of different groups. The comparison between the Control Group and isolated yogic practices was 2.38, the comparison between the Control Group and isolated resistance training was 1.36, the comparison between the Control Group and combined training was 3.39, the comparison between the isolated yogic practices and isolated resistance training was 1.02, the comparison between the isolated yogic practices and combined training was 1.01, and the comparison between the isolated resistance training and combined training was 2.03.

The obtained mean difference of the above comparison was 2.38, 1.36, 3.39, 1.02, 1.01 and 2.03 respectively. The table confidence interval was 0.94 at 0.05 levels. Hence, all the comparisons were significant.

The pre, post and adjusted post test means of flexibility were presented through bar diagram for better understanding of the results of this study in figure -1.

FIGURE 1
BAR DIAGRAM SHOWING THE PRE, POST AND ADJUSTED POST TEST
MEANS OF FLEXIBILITY
(Scores in centimeter)



4.4.2 DISCUSSION ON THE FINDINGS OF FLEXIBILITY

In this work, the analysis of covariance of flexibility was carried out in different Experimental Groups with the inclusion of isolated yogic practices and isolated resistance training and combined training. The same analysis was carried out in another group called the Control Group without inclusion of training. From these analyses, it was found that the results obtained from the Experimental Groups had significant increases in the flexibility when compared with one from the Control Group. This was due to the influence of combined and isolated of yoga and resistance training in the analysis of experimental groups. It was interesting to note that the results obtained from combined training had more significant effect than isolated yogic practices and isolated resistance training on the increased flexibility. Further, the results obtained from isolated yogic practices and isolated resistance training had significant influenced on flexibility than the Control Group. A researcher conducted eight weeks of training such as combined and isolated of yoga and resistance training to increase the flexibility.

These results were found to be in a good agreement with the earlier works done by different researchers. The findings of **Chetna Chaudhary and Birendra Jhajharia (2010)** concluded that the training is an effective means for improving the following variables such as abdominal strength and flexibility among women.

Since the results obtained from the analysis of covariance in very good agreement with the earlier results, it was worthwhile to mention that combined training is one of the better training methods to increase the flexibility. This, in turn, helps to be healthy to the postpartum women.

4.5 COMPUTATION OF ANALYSIS OF COVARIANCE OF BODY MASS INDEX

The following tables illustrated the statistical results to the combined, isolated yogic practices and isolated resistance training on body mass index among postpartum women and ordered adjusted means the groups under study.

TABLE XI
COMPUTATION OF ANALYSIS OF COVARIANCE ON BODY MASS INDEX

(Scores in Index Numbers)

Means	IYP	IRT	CT	Control Group	SV	SS	df	MS	Obtained 'F'
Pre test	28.22	28.16	27.83	28.13	B	0.91	3	0.30	0.10
					W	108.14	36	3	
Post test	28.07	28.01	27.67	28.15	B	1.34	3	0.45	0.15
					W	106.94	36	2.97	
Adjusted post test	27.94	27.94	27.92	28.11	B	0.23	3	0.08	2.83
					W	0.94	35	0.03	

*Significant. F ratio for 3 and 36 = 2.87 and 3 and 35 = 2.87 (0.05 level)

4.5.1 RESULTS OF BODY MASS INDEX

Table XI shows analyzed data on body mass index. The pre test means of body mass index were 28.22 for isolated yogic practices, 28.16 for isolated resistance training, 27.83 for combined training and 28.13 for Control Group. The obtained 'F' ratio 0.10 was lesser than the table 'F' ratio 2.87. Hence, the pre test was not significant at 0.05 level of confidence for degrees of freedom 3 and 36. This proved that there was no significant difference between experimental and control groups indicating that the process of randomization of the groups was perfect while assigning the subjects to groups.

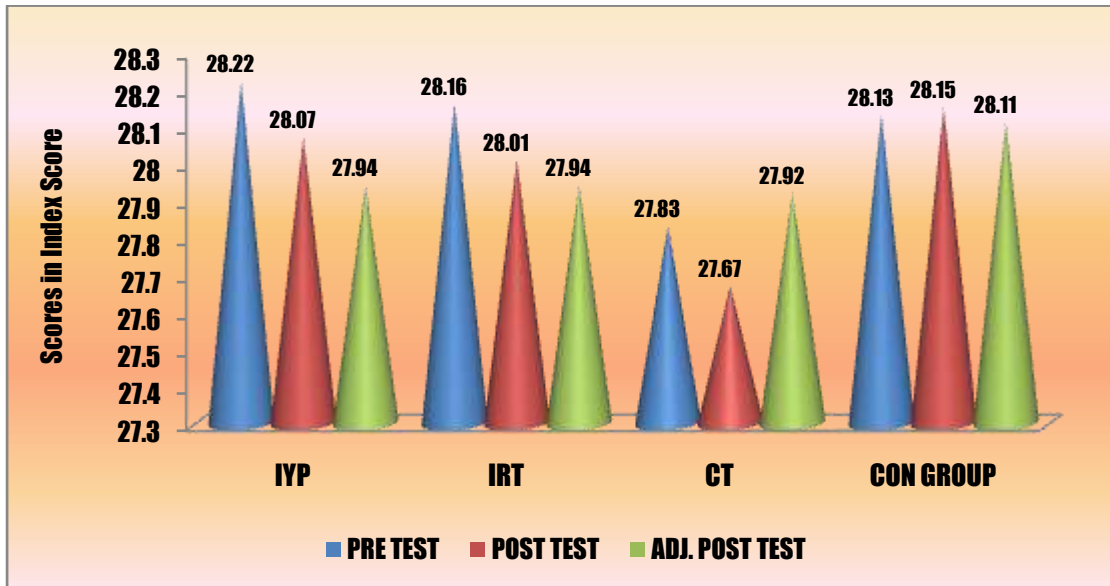
The post test means were 28.07 for isolated yogic practices, 28.01 for isolated resistance training, 27.67 for combined training and 28.15 for Control Group. The obtained 'F' ratio 0.15 was lesser than the table 'F' ratio 2.87. Hence, post test was not

significant at 0.05 level of confidence for the degrees of freedom 3 and 36. This proved that the no differences among the post test means of the groups were significant.

The adjusted post test means were 27.94 for isolated yogic practices, 27.94 for isolated resistance training, 27.92 for combined training and 28.11 for Control Group. The obtained 'F' ratio 2.83 was lesser than the table 'F' ratio 2.87. Hence, adjusted post test was not significant at 0.05 level for the degrees of freedom 3 and 35. This proved that there was no significant difference among means due to the combined, isolated yogic practices and isolated resistance training on body mass index.

The pre, post and adjusted post test means of body mass index were presented through bar diagram for better understanding of the results of this study in figure -2.

FIGURE 2
BAR DIAGRAM SHOWING THE PRE, POST AND ADJUSTED POST TEST
MEANS OF BODY MASS INDEX
(Scores in Index Numbers)



4.5.2 DISCUSSION ON THE FINDINGS OF BODY MASS INDEX

In this work, the analysis of covariance of body mass index was carried out in different Experimental Groups with the inclusion of combined, isolated yogic practices and isolated resistance training. The same analysis was carried out in another group called the Control Group without inclusion of training. From these analyses, it was found that the results obtained from the Experimental Groups had no significant decreases in the body mass index when compared with one from the Control Group. This was due to the influence of combined, isolated yogic practices and isolated resistance training in the analysis of experimental groups. A researcher conducted eight weeks of training such as combined, isolated yogic practices and isolated resistance training to not decrease the body mass index.

These results were found to be in a good agreement with the earlier works done by different researchers. The findings of Ko, et al., (2013) found significant reductions in the participants body weight, body fat percentage, fat mass and basic metabolic rate were observed after the exercise programme.

Since the results obtained from the analysis of covariance in very good agreement with the earlier results, it was worthwhile to mention that combined training is one of the better training methods to not decrease the body mass index. This, in turn, helps to be healthy to the postpartum women.

4.6 COMPUTATION OF ANALYSIS OF COVARIANCE OF MEAN ARTERIAL BLOOD PRESSURE

The following tables illustrated the statistical results to the combined, isolated yogic practices and isolated resistance training on mean arterial blood pressure among postpartum women and ordered adjusted means the groups under study.

TABLE XII
COMPUTATION OF ANALYSIS OF COVARIANCE ON MEAN ARTERIAL BLOOD PRESSURE
(Scores in mm/Hg)

Means	IYP	IRT	CT	Control Group	SV	SS	df	MS	Obtained 'F'
Pre test	102.47	100.95	101.84	100.45	B	24.40	3	8.13	1.03
					W	285.03	36	7.92	
Post test	100.13	97.79	95.62	101.62	B	208.53	3	69.51	15.20*
					W	164.66	36	4.57	
Adjusted post test	99.65	98.01	95.43	102.07	B	230.58	3	76.86	26*
					W	103.45	35	2.96	

*Significant. F ratio for 3 and 36 = 2.87 and 3 and 35 = 2.87 (0.05 level)

4.6.1 RESULTS OF MEAN ARTERIAL BLOOD PRESSURE

Table XII shows analyzed data on mean arterial blood pressure. The pre test means of mean arterial blood pressure were 102.47 for isolated yogic practices, 100.95 for isolated resistance training, 101.84 for combined training and 100.45 for Control Group. The obtained 'F' ratio 1.03 was lesser than the table 'F' ratio 2.87. Hence, the pre test was not significant at 0.05 level of confidence for degrees of freedom 3 and 36. This proved that there was no significant difference between experimental and control groups indicating that the process of randomization of the groups was perfect while assigning the subjects to groups.

The post test means were 100.13 for isolated yogic practices, 97.79 for isolated resistance training, 95.62 for combined training and 101.62 for Control Group. The obtained 'F' ratio 15.20 was higher than the table 'F' ratio 2.87. Hence, post test was

significant at 0.05 level of confidence for the degrees of freedom 3 and 36. This proved that the differences among the post test means of the groups were significant.

The adjusted post test means were 99.65 for isolated yogic practices, 98.01 for isolated resistance training, 95.43 for combined training and 102.27 for Control Group. The obtained 'F' ratio 26 was higher than the table 'F' ratio 2.87. Hence, adjusted post test was significant at 0.05 level for the degrees of freedom 3 and 35. This proved that there was significant difference among means due to the combined and isolated of yoga and resistance training on mean arterial blood pressure. To find out the paired mean difference between groups, Scheffe's Post Hoc test was applied. The outcome of the subsequent test is represented in the table - XIII.

TABLE XIII
COMPUTATION OF SCHEFFE'S POST HOC TEST ORDERED ADJUSTED
FINAL MEAN DIFFERENCE OF MEAN ARTERIAL BLOOD PRESSURE
(Scores in mm/Hg)

Control Group	Isolated Yogic Practices	Isolated Resistance Training	Combined Training	MD	CI
102.07	99.65	-	-	2.42*	2.26
102.07	-	98.01	-	4.06*	2.26
102.07	-	-	95.43	6.64*	2.26
-	99.65	98.01	-	1.64	2.26
-	99.65	-	95.43	4.22*	2.26
-	-	98.01	95.43	2.58*	2.26

* Significant at 0.05 level.

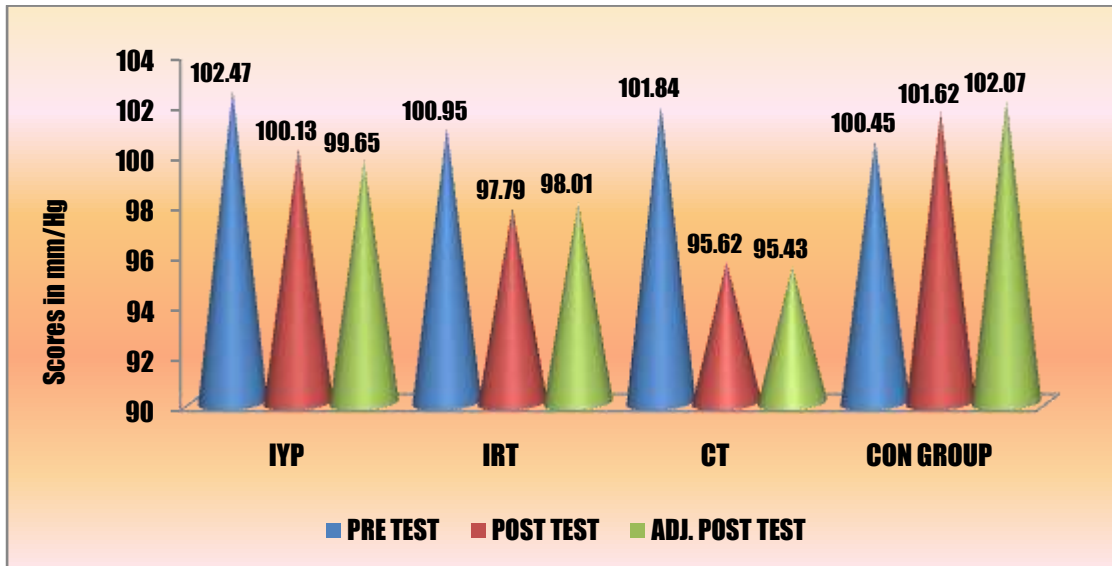
Table XIII shows the Scheffe's Post Hoc Test of ordered adjusted final means difference of mean arterial blood pressure of different groups. The comparison between the Control Group and isolated yogic practices was 2.42, the comparison between the Control Group and isolated resistance training was 4.06, the comparison between the Control Group and combined training was 6.64, the comparison between the isolated yogic practices and isolated resistance training was 1.64, the comparison

between the isolated yogic practices and combined training was 4.22, and the comparison between the isolated resistance training and combined training was 2.58.

The obtained mean difference of the above comparison was 2.42, 4.06, 6.64, 1.64, 4.22 and 2.58 respectively. The table confidence interval was 2.26 at 0.05 levels. Hence, all the comparisons were significant, except fourth comparison.

The pre, post and adjusted post test means of mean arterial blood pressure were presented through bar diagram for better understanding of the results of this study in figure 3.

FIGURE 3
BAR DIAGRAM SHOWING THE PRE, POST AND ADJUSTED POST TEST
MEANS OF MEAN ARTERIAL BLOOD PRESSURE
(Scores in mm/Hg)



4.6.2 DISCUSSION ON THE FINDINGS OF MEAN ARTERIAL BLOOD PRESSURE

In this work, the analysis of covariance of mean arterial blood pressure was carried out in different Experimental Groups with the inclusion of combined, isolated yogic practices and isolated resistance training. The same analysis was carried out in another group called the Control Group without inclusion of training. From these analyses, it was found that the results obtained from the Experimental Groups had significant decreases in the mean arterial blood pressure when compared with one from the Control Group. This was due to the influence of combined, isolated yogic practices and isolated resistance training in the analysis of experimental groups. It was interesting to note that the results obtained from combined training had more significant effect than isolated yogic practices and isolated resistance training on mean arterial blood pressure. Further, the results obtained from isolated yogic practices and isolated resistance training had significant influenced on mean arterial blood pressure than the Control Group. A researcher conducted 8 weeks of training such as combined, isolated yogic practices and isolated resistance training to decrease the mean arterial blood pressure.

These results were found to be in a good agreement with the earlier works done by different researchers. The findings of **Cardoso, et al. (2010)** investigated the exercise might acutely decrease ambulatory blood pressure after exercise. **Christian Roberts, et al. (2002)** investigated the effect exercise intervention resulted in improvements in blood pressure and the metabolic profile within 3 weeks.

Since the results obtained from the analysis of covariance in very good agreement with the earlier results, it was worthwhile to mention that combined training is one of the better training methods to decrease the mean arterial blood pressure. This, in turn, helps to be healthy to the postpartum women.

4.7 COMPUTATION OF ANALYSIS OF COVARIANCE OF FORCED VITAL CAPACITY

The following tables illustrated the statistical results to the combined, isolated yogic practices and isolated resistance training on forced vital capacity among postpartum women and ordered adjusted means the groups under study.

TABLE XIV
COMPUTATION OF ANALYSIS OF COVARIANCE ON FORCED VITAL CAPACITY
(Scores in ml)

Means	IYP	IRT	CT	Control Group	SV	SS	df	MS	Obtained 'F'
Pre test	2625	2690	2635	2615	B	33687.5	3	11229.17	0.13
					W	3135750	36	87104.17	
Post test	2950	2840	3120	2605	B	1397187	3	465729.17	5.65*
					W	2967250	36	82423.61	
Adjusted post test	2964.35	2796.96	3125.52	2628.18	B	1376981.42	3	458993.81	30.74*
					W	522547.28	35	14929.92	

*Significant. F ratio for 3 and 36 = 2.87 and 3 and 35 = 2.87 (0.05 level)

4.7.1 RESULTS OF FORCED VITAL CAPACITY

Table XIV shows analyzed data on forced vital capacity. The pre test means of forced vital capacity were 2625 for isolated yogic practices, 2690 for isolated resistance training, 2635 for combined training and 2615 for Control Group. The obtained 'F' ratio 0.13 was lesser than the table 'F' ratio 2.87. Hence, the pre test was not significant at 0.05 level of confidence for degrees of freedom 3 and 36. This proved that there was no significant difference between experimental and control groups indicating that the process of randomization of the groups was perfect while assigning the subjects to groups.

The post test means were 2950 for isolated yogic practices, 2840 for isolated resistance training, 3120 for combined training and 2605 for Control Group. The obtained 'F' ratio 5.65 was higher than the table 'F' ratio 2.87. Hence, post test was

significant at 0.05 level of confidence for the degrees of freedom 3 and 36. This proved that the differences among the post test means of the groups were significant.

The adjusted post test means were 2964.35 for isolated yogic practices, 2796.96 for isolated resistance training, 3125.52 for combined training and 2628.18 for Control Group. The obtained 'F' ratio 30.74 was higher than the table 'F' ratio 2.87. Hence, adjusted post test was significant at 0.05 level for the degrees of freedom 3 and 35. This proved that there was significant difference among means due to the combined, isolated yogic practices and isolated resistance training on forced vital capacity. To find out the paired mean difference between groups, Scheffe's Post Hoc test was applied. The outcome of the subsequent test is represented in the table - XV.

TABLE XV
COMPUTATION OF SCHEFFE'S POST HOC TEST ORDERED ADJUSTED
FINAL MEAN DIFFERENCE OF FORCED VITAL CAPACITY
(Scores in ml)

Control Group	Isolated Yogic Practices	Isolated Resistance Training	Combined Training	MD	CI
2628.18	2964.35	-	-	336.17*	160.34
2628.18	-	2796.96	-	168.78*	160.34
2628.18	-	-	3125.52	497.34*	160.34
-	2964.35	2796.96	-	167.39*	160.34
-	2964.35	-	3125.52	161.17*	160.34
-	-	2796.96	3125.52	328.56*	160.34

* Significant

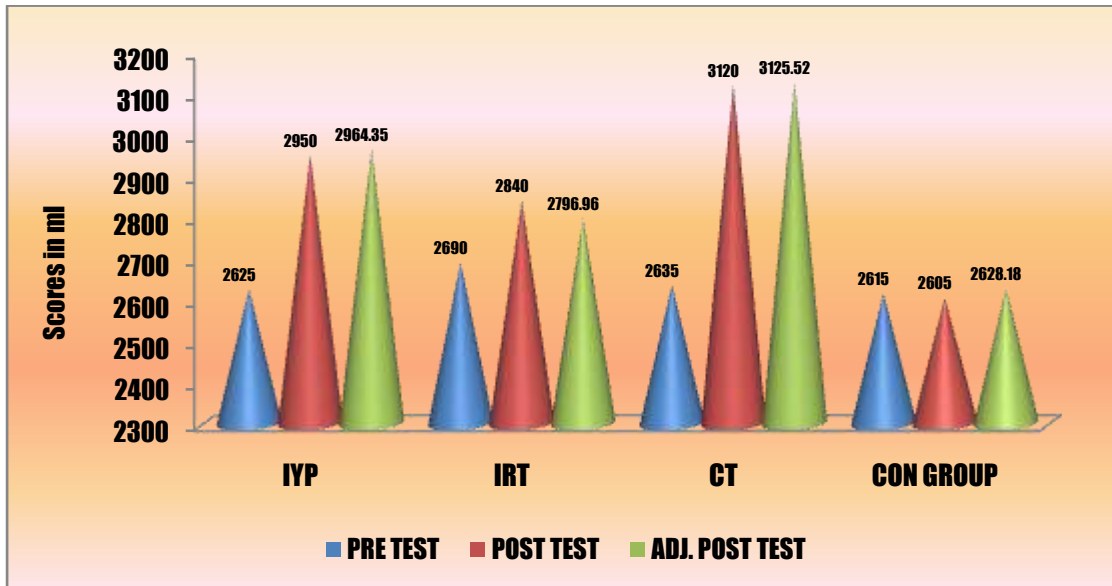
Table XV shows the Scheffe's Post Hoc Test of ordered adjusted final means difference of forced vital capacity of different groups. The comparison between the Control Group and isolated yogic practices was 336.17, the comparison between the Control Group and isolated resistance training was 168.78, the comparison between the Control Group and combined training was 497.34, the comparison between the isolated yogic practices and isolated resistance training was 167.39, the comparison

between the isolated yogic practices and combined training was 161.17, and the comparison between the isolated resistance training and combined training was 328.56.

The obtained mean difference of the above comparison was 336.17, 168.78, 497.34, 167.39, 161.17 and 328.56 respectively. The table confidence interval was 160.34 at 0.05 levels. Hence, all the comparisons were significant, except fourth comparison.

The pre, post and adjusted post test means of forced vital capacity were presented through bar diagram for better understanding of the results of this study in figure -4.

FIGURE 5
BAR DIAGRAM SHOWING THE PRE, POST AND ADJUSTED POST TEST
MEANS OF FORCED VITAL CAPACITY
(Scores in ml)



4.7.2 DISCUSSION ON THE FINDINGS OF FORCED VITAL CAPACITY

In this work, the analysis of covariance of forced vital capacity was carried out in different Experimental Groups with the inclusion of combined, isolated yogic practices and isolated resistance training. The same analysis was carried out in another group called the Control Group without inclusion of training. From these analyses, it was found that the results obtained from the Experimental Groups had significant increases in the forced vital capacity when compared with one from the Control Group. This was due to the influence of combined, isolated yogic practices and isolated resistance training in the analysis of experimental groups. It was interesting to note that the results obtained from combined training had more significant effect than isolated yogic practices and isolated resistance training on the increased forced vital capacity. Further, the results obtained from isolated resistance training had significant influenced on forced vital capacity than the Control Group. A researcher conducted eight weeks of training such as combined, isolated yogic practices and isolated resistance training to increase the forced vital capacity.

These results were found to be in a good agreement with the earlier works done by different researchers. The findings of **Denadai, et al. (2006)** analyzed the effect training programs on selected aerobic physiological indices. Finding was concluded that significantly improved in VO_2 max, vital capacity, and RE.

Since the results obtained from the analysis of covariance in very good agreement with the earlier results, it was worthwhile to mention that combined training is one of the better training methods to increase the forced vital capacity. This, in turn, helps to be healthy to the postpartum women.

4.8 COMPUTATION OF ANALYSIS OF COVARIANCE OF BREATH HOLDING TIME

The following tables illustrated the statistical results to the combined, isolated yogic practices and isolated resistance training on breath holding time among postpartum women and ordered adjusted means the groups under study.

TABLE XVI
COMPUTATION OF ANALYSIS OF COVARIANCE ON BREATH HOLDING TIME
(Scores in seconds)

Means	IYP	IRT	CT	Control Group	SV	SS	df	MS	Obtained 'F'
Pre test	47	46.40	46	46.50	B	5.08	3	1.69	0.27
					W	222.90	36	6.19	
Post test	50.90	48.30	53.20	45.80	B	307.70	3	102.57	21.20*
					W	174.20	36	4.84	
Adjusted post test	50.69	48.33	53.39	45.79	B	315.90	3	105.30	26.40*
					W	139.62	35	3.99	

*Significant. F ratio for 3 and 36 = 2.87 and 3 and 35 = 2.87 (0.05 level)

4.8.1 RESULTS OF BREATH HOLDING TIME

Table XVI shows analyzed data on breath holding time. The pre test means of breath holding time were 47 for isolated yogic practices, 46.40 for isolated resistance training, 46 for combined training and 46.50 for Control Group. The obtained 'F' ratio 0.27 was lesser than the table 'F' ratio 2.87. Hence, the pre test was not significant at 0.05 level of confidence for degrees of freedom 3 and 36. This proved that there was no significant difference between experimental and control groups indicating that the process of randomization of the groups was perfect while assigning the subjects to groups.

The post test means were 50.90 for isolated yogic practices, 48.30 for isolated resistance training, 53.20 for combined training and 45.80 for Control Group. The obtained 'F' ratio 21.20 was higher than the table 'F' ratio 2.87. Hence, post test was

significant at 0.05 level of confidence for the degrees of freedom 3 and 36. This proved that the differences among the post test means of the groups were significant.

The adjusted post test means were 50.69 for isolated yogic practices, 48.33 for isolated resistance training, 53.39 for combined training and 45.79 for Control Group. The obtained 'F' ratio 26.40 was higher than the table 'F' ratio 2.87. Hence, adjusted post test was significant at 0.05 level for the degrees of freedom 3 and 35. This proved that there was significant difference among means due to the combined, isolated yogic practices and isolated resistance training on breath holding time. To find out the paired mean difference between groups, Scheffe's Post Hoc test was applied. The outcome of the subsequent test is represented in the table - XVII.

TABLE XVII
COMPUTATION OF SCHEFFE'S POST HOC TEST ORDERED ADJUSTED
FINAL MEAN DIFFERENCE OF BREATH HOLDING TIME
(Scores in seconds)

Control Group	Isolated Yogic Practices	Isolated Resistance Training	Combined Training	MD	CI
45.79	50.69	-	-	4.90*	2.62
45.79	-	48.33	-	2.54*	2.62
45.79	-	-	53.39	7.60*	2.62
-	50.69	48.33	-	2.36	2.62
-	50.69	-	53.39	2.70*	2.62
-	-	48.33	53.39	5.06*	2.62

* Significant at 0.05 level.

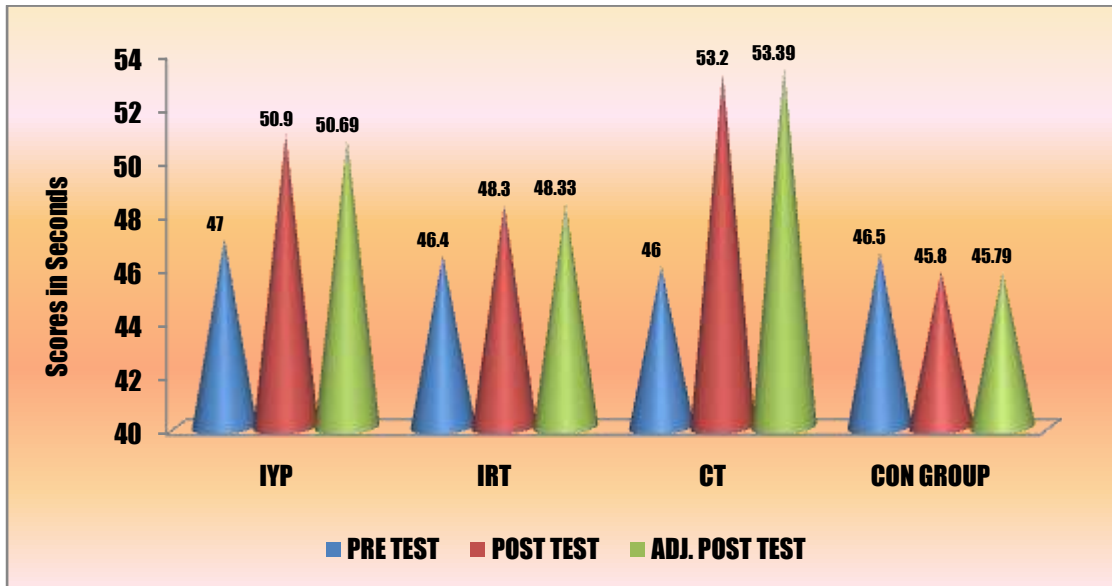
Table XVII shows the Scheffe's Post Hoc Test of ordered adjusted final means difference of breath holding time of different groups. The comparison between the Control Group and isolated yogic practices was 4.90, the comparison between the Control Group and isolated resistance training was 2.54, the comparison between the Control Group and combined training was 7.60, the comparison between the isolated yogic practices and isolated resistance training was 2.36, the comparison between the

isolated yogic practices and combined training was 2.70, and the comparison between the isolated resistance training and combined training was 5.06.

The obtained mean difference of the above comparison was 4.90, 2.54, 7.60, 2.36, 2.70 and 5.06 respectively. The table confidence interval was 2.62 at 0.05 levels. Hence, all the comparisons were significant, except fourth comparison.

The pre, post and adjusted post test means of breath holding time were presented through bar diagram for better understanding of the results of this study in figure -5.

FIGURE 5
BAR DIAGRAM SHOWING THE PRE, POST AND ADJUSTED POST TEST
MEANS OF BREATH HOLDING TIME
(Scores in seconds)



4.8.2 DISCUSSION ON THE FINDINGS OF BREATH HOLDING TIME

In this work, the analysis of covariance of breath holding time was carried out in different Experimental Groups with the inclusion of combined, isolated yogic practices and isolated resistance training. The same analysis was carried out in another group called the Control Group without inclusion of training. From these analyses, it was found that the results obtained from the Experimental Groups had significant increases in the breath holding time when compared with one from the Control Group. This was due to the influence of combined, isolated yogic practices and isolated resistance training in the analysis of experimental groups. It was interesting to note that the results obtained from combined training had more significant effect than isolated yogic practices and isolated resistance training on the increased breath holding time. Further, the results obtained from isolated yogic practices and isolated resistance training had significant influenced on breath holding time than the Control Group. A researcher conducted eight weeks of training such as combined, isolated yogic practices and isolated resistance training to increase the breath holding time.

These results were found to be in a good agreement with the earlier works done by different researchers. The findings of **Raven, et al. (2013)** evaluated endurance capabilities, agility, breath holding time and low percent of body fat clearly differentiate them from the sedentary population.

Since the results obtained from the analysis of covariance in very good agreement with the earlier results, it was worthwhile to mention that combined training is one of the better training methods to increase the breath holding time. This, in turn, helps to be healthy to the postpartum women.

4.9 COMPUTATION OF ANALYSIS OF COVARIANCE OF TENSION

The following tables illustrated the statistical results to the combined, isolated yogic practices and isolated resistance training on tension among postpartum women and ordered adjusted means the groups under study.

TABLE XVIII
COMPUTATION OF ANALYSIS OF COVARIANCE ON TENSION
(Scores in numbers)

Means	IYP	IRT	CT	Control Group	SV	SS	df	MS	Obtained 'F'
Pre test	12.90	12.30	12.90	12.20	B	4.27	3	1.42	0.54
					W	95.50	36	2.65	
Post test	10.50	10.30	9.20	12.50	B	56.68	3	18.89	14.56*
					W	46.70	36	1.30	
Adjusted post test	10.35	10.43	9.05	12.68	B	66.36	3	22.12	30.14*
					W	25.68	35	0.73	

*Significant. F ratio for 3 and 36 = 2.87 and 3 and 35 = 2.87 (0.05 level)

4.9.1 RESULTS OF TENSION

Table XVIII shows analyzed data on tension. The pre test means of tension were 12.90 for isolated yogic practices, 12.30 for isolated resistance training, 12.90 for combined training and 12.20 for Control Group. The obtained 'F' ratio 0.54 was lesser than the table 'F' ratio 2.87. Hence, the pre test was not significant at 0.05 level of confidence for degrees of freedom 3 and 36. This proved that there was no significant difference between experimental and control groups indicating that the process of randomization of the groups was perfect while assigning the subjects to groups.

The post test means were 10.50 for isolated yogic practices, 10.30 for isolated resistance training, 9.20 for combined training and 12.50 for Control Group. The obtained 'F' ratio 14.56 was higher than the table 'F' ratio 2.87. Hence, post test was significant at 0.05 level of confidence for the degrees of freedom 3 and 36. This proved that the differences among the post test means of the groups were significant.

The adjusted post test means were 10.35 for isolated yogic practices, 10.43 for isolated resistance training, 9.05 for combined training and 12.68 for Control Group. The obtained 'F' ratio 30.14 was higher than the table 'F' ratio 2.87. Hence, adjusted post test was significant at 0.05 level for the degrees of freedom 3 and 35. This proved that there was significant difference among means due to the combined, isolated yogic practices and isolated resistance training on tension. To find out the paired mean difference between groups, Scheffe's Post Hoc test was applied. The outcome of the subsequent test is represented in the table - XIX.

TABLE XIX
COMPUTATION OF SCHEFFE'S POST HOC TEST ORDERED ADJUSTED
FINAL MEAN DIFFERENCE OF TENSION
(Scores in numbers)

Control Group	Isolated Yogic Practices	Isolated Resistance Training	Combined Training	MD	CI
12.68	-	-	-	2.33*	1.12
12.68	-	10.43	-	2.25*	1.12
12.68	-	-	9.05	3.63*	1.12
-	10.35	10.43	-	0.08	1.12
-	10.35	-	9.05	1.30*	1.12
-	-	10.43	9.05	1.38*	1.12

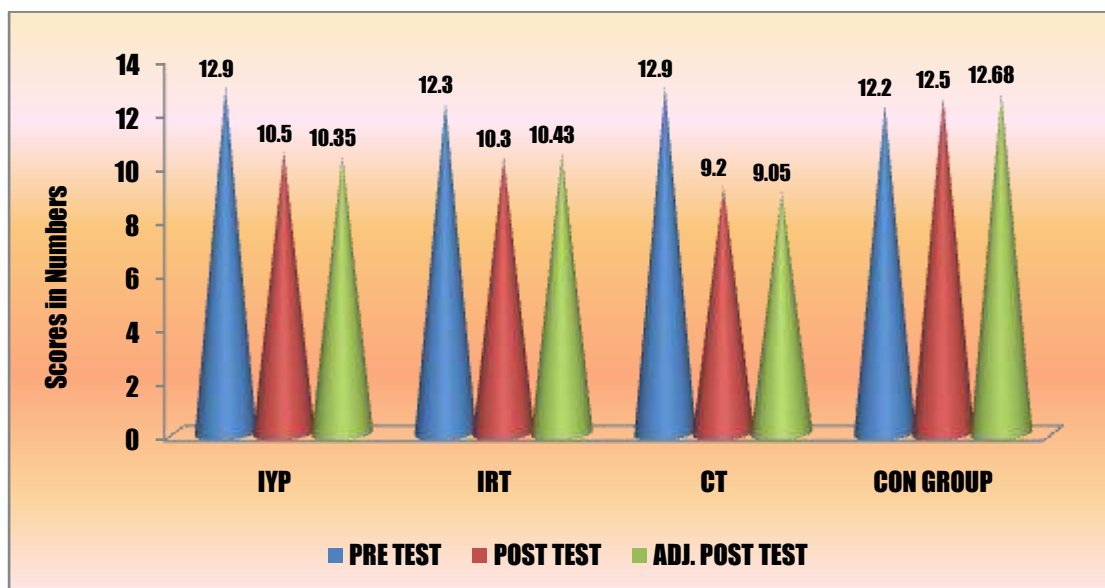
* Significant at 0.05 level.

Table XIX shows the Scheffe's Post Hoc Test of ordered adjusted final means difference of tension of different groups. The comparison between the Control Group and isolated yogic practices was 2.33, the comparison between the Control Group and isolated resistance training was 2.25, the comparison between the Control Group and combined training was 3.63, the comparison between the isolated yogic practices and isolated resistance training was 0.08, the comparison between the isolated yogic practices and combined training was 1.30, and the comparison between the isolated resistance training and combined training was 1.38.

The obtained mean difference of the above comparison was 2.33, 2.25, 3.63, 0.08, 1.30 and 1.38 respectively. The table confidence interval was 1.12 at 0.05 levels. Hence, all the comparisons were significant, except fourth comparison.

The pre, post and adjusted post test means of tension were presented through bar diagram for better understanding of the results of this study in figure -6.

FIGURE 6
BAR DIAGRAM SHOWING THE PRE, POST AND ADJUSTED POST TEST
MEANS OF TENSION
(Scores in numbers)



4.9.2 DISCUSSION ON THE FINDINGS OF TENSION

In this work, the analysis of covariance of tension was carried out in different Experimental Groups with the inclusion of combined, isolated yogic practices and isolated resistance training. The same analysis was carried out in another group called the Control Group without inclusion of training. From these analyses, it was found that the results obtained from the Experimental Groups had significant decreases in the tension when compared with one from the Control Group. This was due to the influence of combined, isolated yogic practices and isolated resistance training in the analysis of experimental groups. It was interesting to note that the results obtained from combined training had more significant effect than isolated yogic practices and isolated resistance training on the decreased tension. Further, the results obtained from isolated yogic practices and isolated resistance training had significant influenced on tension than the Control Group. A researcher conducted eight weeks of training such as combined, isolated yogic practices and isolated resistance training to decrease the tension.

These results were found to be in a good agreement with the earlier works done by different researchers. The findings of Pritchett, et al. (2017) provided support for the effectiveness of exercise in reducing postpartum depressive symptoms of tension.

Since the results obtained from the analysis of covariance in very good agreement with the earlier results, it was worthwhile to mention that combined training is one of the better training methods to increase the tension. This, in turn, helps to be healthy to the postpartum women.

4.10 COMPUTATION OF ANALYSIS OF COVARIANCE OF DEPRESSION

The following tables illustrated the statistical results to the combined, isolated yogic practices and isolated resistance training on depression among postpartum women and ordered adjusted means the groups under study.

TABLE XX
COMPUTATION OF ANALYSIS OF COVARIANCE ON DEPRESSION
(Scores in numbers)

Means	IYP	IRT	CT	Control Group	SV	SS	df	MS	Obtained 'F'
Pre test	13.70	13.80	14.30	13.30	B	5.08	3	1.69	0.60
					W	101.90	36	2.83	
Post test	11.10	11	9.60	13.20	B	66.08	3	22.03	13.93*
					W	56.90	36	1.58	
Adjusted post test	11.13	10.99	9.40	13.38	B	76.42	3	25.47	20.83*
					W	42.80	35	1.22	

*Significant. F ratio for 3 and 36 = 2.87 and 3 and 35 = 2.87 (0.05 level)

4.10.1 RESULTS OF DEPRESSION

Table XX shows analyzed data on depression. The pre test means of depression were 13.70 for isolated yogic practices, 13.80 for isolated resistance training, 14.30 for combined training and 13.30 for Control Group. The obtained 'F' ratio 0.60 was lesser than the table 'F' ratio 2.87. Hence, the pre test was not significant at 0.05 level of confidence for degrees of freedom 3 and 36. This proved that there was no significant difference between experimental and control groups indicating that the process of randomization of the groups was perfect while assigning the subjects to groups.

The post test means were 11.10 for isolated yogic practices, 11 for isolated resistance training, 9.60 for combined training and 13.20 for Control Group. The obtained 'F' ratio 13.93 was higher than the table 'F' ratio 2.87. Hence, post test was

significant at 0.05 level of confidence for the degrees of freedom 3 and 36. This proved that the differences among the post test means of the groups were significant.

The adjusted post test means were 11.13 for isolated yogic practices, 10.99 for isolated resistance training, 9.40 for combined training and 13.38 for Control Group. The obtained 'F' ratio 20.83 was higher than the table 'F' ratio 2.87. Hence, adjusted post test was significant at 0.05 level for the degrees of freedom 3 and 35. This proved that there was significant difference among means due to the combined, isolated yogic practices and isolated resistance training on depression. To find out the paired mean difference between groups, Scheffe's Post Hoc test was applied. The outcome of the subsequent test is represented in the table - XXI.

TABLE XXI
COMPUTATION OF SCHEFFE'S POST HOC TEST ORDERED ADJUSTED
FINAL MEAN DIFFERENCE OF DEPRESSION

(Scores in numbers)

Control Group	Isolated Yogic Practices	Isolated Resistance Training	Combined Training	MD	CI
13.38	11.13	-	-	2.25*	1.45
13.38	-	10.99	-	2.39*	1.45
13.38	-	-	9.40	3.98*	1.45
-	11.13	10.99	-	0.14	1.45
-	11.13	-	9.40	1.73*	1.45
-	-	10.99	9.40	1.59*	1.45

* Significant at 0.05 level.

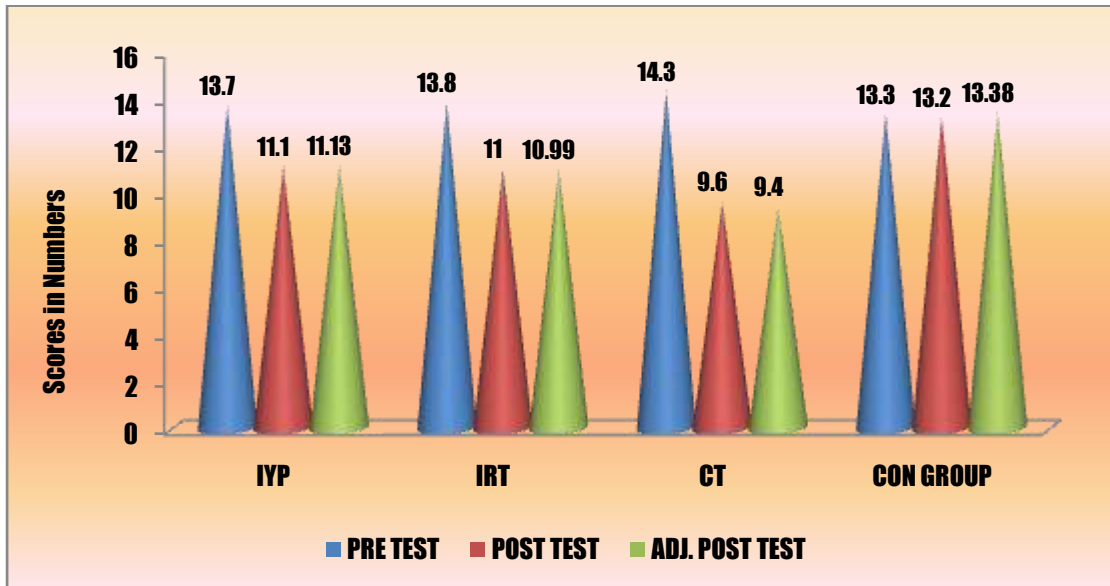
Table XXI shows the Scheffe's Post Hoc Test of ordered adjusted final means difference of depression of different groups. The comparison between the Control Group and isolated yogic practices was 2.25, the comparison between the Control Group and isolated resistance training was 2.39, the comparison between the Control Group and combined training was 3.98, the comparison between the isolated yogic practices and isolated resistance training was 0.14, the comparison between the

isolated yogic practices and combined training was 1.73, and the comparison between the isolated resistance training and combined training was 1.59.

The obtained mean difference of the above comparison was 2.25, 2.39, 3.98, 0.14, 1.73 and 1.59 respectively. The table confidence interval was 1.45 at 0.05 levels. Hence, all the comparisons were significant, except fourth comparison.

The pre, post and adjusted post test means of depression were presented through bar diagram for better understanding of the results of this study in figure -7.

FIGURE 7
BAR DIAGRAM SHOWING THE PRE, POST AND ADJUSTED POST TEST
MEANS OF DEPRESSION
(Scores in numbers)



4.10.2 DISCUSSION ON THE FINDINGS OF DEPRESSION

In this work, the analysis of covariance of depression was carried out in different Experimental Groups with the inclusion of yoga and resistance training and combined training. The same analysis was carried out in another group called the Control Group without inclusion of training. From these analyses, it was found that the results obtained from the Experimental Groups had significant decreases in the depression when compared with one from the Control Group. This was due to the influence of combined, isolated yogic practices and isolated resistance training in the analysis of experimental groups. It was interesting to note that the results obtained from combined training had more significant effect than isolated yogic practices and isolated resistance training on the decreased depression. Further, the results obtained from isolated yogic practices and isolated resistance training had significant influenced on depression than the Control Group. A researcher conducted eight weeks of training such as combined and isolated of yoga and resistance training to decrease the depression.

These results were found to be in a good agreement with the earlier works done by different researchers. The findings of Buttner, et al., (2015) found yoga group experienced significantly greater rate of improvement in depression and anxiety.

Since the results obtained from the analysis of covariance in very good agreement with the earlier results, it was worthwhile to mention that combined training is one of the better training methods to decrease the depression. This, in turn, helps to be healthy to the postpartum women.

4.11 COMPUTATION OF ANALYSIS OF COVARIANCE OF ANGER

The following tables illustrated the statistical results to the combined, isolated yogic practices and isolated resistance training on anger among postpartum women and ordered adjusted means the groups under study.

TABLE XXII
COMPUTATION OF ANALYSIS OF COVARIANCE ON ANGER
(Scores in numbers)

Means	IYP	IRT	CT	Control Group	SV	SS	df	MS	Obtained 'F'
Pre test	14.10	14	13.60	13.70	B	1.70	3	0.57	0.16
					W	129.40	36	3.59	
Post test	12.40	12	10.40	14	B	65.60	3	21.87	10.52*
					W	74.80	36	2.08	
Adjusted post test	12.24	11.90	10.56	14.10	B	63.74	3	21.25	32.93*
					W	22.58	35	0.65	

*Significant. F ratio for 3 and 36 = 2.87 and 3 and 35 = 2.87 (0.05 level)

4.11.1 RESULTS OF ANGER

Table XXII shows analyzed data on anger. The pre test means of anger were 14.10 for isolated yogic practices, 14 for isolated resistance training, 13.60 for combined training and 13.70 for Control Group. The obtained 'F' ratio 0.16 was lesser than the table 'F' ratio 2.87. Hence, the pre test was not significant at 0.05 level of confidence for degrees of freedom 3 and 36. This proved that there was no significant difference between experimental and control groups indicating that the process of randomization of the groups was perfect while assigning the subjects to groups.

The post test means were 12.40 for isolated yogic practices, 12 for isolated resistance training, 10.40 for combined training and 14 for Control Group. The obtained 'F' ratio 10.52 was higher than the table 'F' ratio 2.87. Hence, post test was significant at 0.05 level of confidence for the degrees of freedom 3 and 36. This proved that the differences among the post test means of the groups were significant.

The adjusted post test means were 12.24 for isolated yogic practices, 11.90 for isolated resistance training, 10.56 for combined training and 14.10 for Control Group. The obtained 'F' ratio 32.93 was higher than the table 'F' ratio 2.87. Hence, adjusted post test was significant at 0.05 level for the degrees of freedom 3 and 35. This proved that there was significant difference among means due to the combined and isolated of yoga and resistance training on anger. To find out the paired mean difference between groups, Scheffe's Post Hoc test was applied. The outcome of the subsequent test is represented in the table - XXIII.

TABLE XXIII
COMPUTATION OF SCHEFFE'S POST HOC TEST ORDERED ADJUSTED
FINAL MEAN DIFFERENCE OF ANGER
 (Scores in numbers)

Control Group	Isolated Yogic Practices	Isolated Resistance Training	Combined Training	MD	CI
14.10	12.24	-	-	1.86*	1.05
14.10	-	11.90	-	2.20*	1.05
14.10	-	-	10.56	3.54*	1.05
-	12.24	11.90	-	0.34	1.05
-	12.24	-	10.56	1.68*	1.05
-	-	11.90	10.56	1.34*	1.05

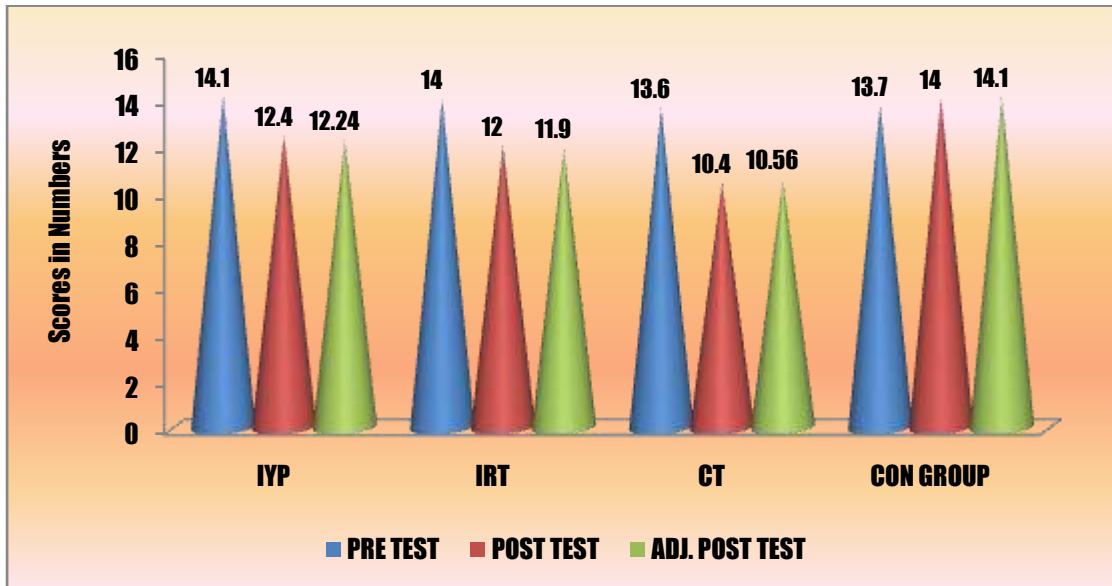
* Significant at 0.05 level.

Table XXIII shows the Scheffe's Post Hoc Test of ordered adjusted final means difference of anger of different groups. The comparison between the Control Group and isolated yogic practices was 1.86, the comparison between the Control Group and isolated resistance training was 2.20, the comparison between the Control Group and combined training was 3.54, the comparison between the isolated yogic practices and isolated resistance training was 0.34, the comparison between the isolated yogic practices and combined training was 1.68, and the comparison between the isolated resistance training and combined training was 1.34.

The obtained mean difference of the above comparison was 1.86, 2.20, 3.54, 0.34, 1.68 and 1.34 respectively. The table confidence interval was 1.05 at 0.05 levels. Hence, all the comparisons were significant, except fourth comparison.

The pre, post and adjusted post test means of anger were presented through bar diagram for better understanding of the results of this study in figure -8.

FIGURE 8
BAR DIAGRAM SHOWING THE PRE, POST AND ADJUSTED POST TEST
MEANS OF ANGER
(Scores in numbers)



4.11.2 DISCUSSION ON THE FINDINGS OF ANGER

In this work, the analysis of covariance of anger was carried out in different Experimental Groups with the inclusion of combined, isolated yogic practices and isolated resistance training. The same analysis was carried out in another group called the Control Group without inclusion of training. From these analyses, it was found that the results obtained from the Experimental Groups had significant decreases in the anger when compared with one from the Control Group. This was due to the influence of combined, isolated yogic practices and isolated resistance training in the analysis of experimental groups. It was interesting to note that the results obtained from combined training had more significant effect than isolated yogic practices and isolated resistance training on the decreased anger. Further, the results obtained from isolated yogic practices and isolated resistance training had significant influenced on anger than the Control Group. A researcher conducted eight weeks of training such as combined, isolated yogic practices and isolated resistance training to decrease the anger.

These results were found to be in a good agreement with the earlier works done by different researchers. The findings of Field, et al. (2013) found yoga group and the support group did not differ. They both had lower depression (CES-D), anxiety (STAI) and anger (STAXI) scores and improved relationship scores.

Since the results obtained from the analysis of covariance in very good agreement with the earlier results, it was worthwhile to mention that combined training is one of the better training methods to increase the anger. This, in turn, helps to be healthy to the postpartum women.

4.12 COMPUTATION OF ANALYSIS OF COVARIANCE OF VIGOUR

The following tables illustrated the statistical results to the combined, isolated yogic practices and isolated resistance training on vigour among postpartum women and ordered adjusted means the groups under study.

TABLE XXIV
COMPUTATION OF ANALYSIS OF COVARIANCE ON VIGOUR
(Scores in numbers)

Means	IYP	IRT	CT	Control Group	SV	SS	df	MS	Obtained 'F'
Pre test	10.90	10.30	10.40	10.60	B	2.10	3	0.70	0.23
					W	107.80	36	2.99	
Post test	12.70	12.10	14	10.70	B	56.27	3	18.76	10.37*
					W	65.10	36	1.81	
Adjusted post test	12.49	12.25	14.09	10.67	B	58.78	3	19.59	28.05*
					W	24.45	35	0.70	

*Significant. F ratio for 3 and 36 = 2.87 and 3 and 35 = 2.87 (0.05 level)

4.12.1 RESULTS OF VIGOUR

Table XXIV shows analyzed data on vigour. The pre test means of vigour were 10.90 for isolated yogic practices, 10.30 for isolated resistance training, 10.40 for combined training and 10.60 for Control Group. The obtained 'F' ratio 0.23 was lesser than the table 'F' ratio 2.87. Hence, the pre test was not significant at 0.05 level of confidence for degrees of freedom 3 and 36. This proved that there was no significant difference between experimental and control groups indicating that the process of randomization of the groups was perfect while assigning the subjects to groups.

The post test means were 12.70 for isolated yogic practices, 12.10 for isolated resistance training, 14 for combined training and 10.70 for Control Group. The obtained 'F' ratio 10.37 was higher than the table 'F' ratio 2.87. Hence, post test was significant at 0.05 level of confidence for the degrees of freedom 3 and 36. This proved that the differences among the post test means of the groups were significant.

The adjusted post test means were 12.49 for isolated yogic practices, 12.25 for isolated resistance training, 14.09 for combined training and 10.67 for Control Group. The obtained 'F' ratio 28.05 was higher than the table 'F' ratio 2.87. Hence, adjusted post test was significant at 0.05 level for the degrees of freedom 3 and 35. This proved that there was significant difference among means due to the combined, isolated yogic practices and isolated resistance training on vigour. To find out the paired mean difference between groups, Scheffe's Post Hoc test was applied. The outcome of the subsequent test is represented in the table - XXV.

TABLE XXV
COMPUTATION OF SCHEFFE'S POST HOC TEST ORDERED ADJUSTED
FINAL MEAN DIFFERENCE OF VIGOUR
 (Scores in numbers)

Control Group	Isolated Yogic Practices	Isolated Resistance Training	Combined Training	MD	CI
10.67	12.49	-	-	1.82*	1.10
10.67	-	12.25	-	1.58*	1.10
10.67	-	-	14.09	3.42*	1.10
-	12.49	12.25	-	0.24	1.10
-	12.49	-	14.09	1.60*	1.10
-	-	12.25	14.09	1.84*	1.10

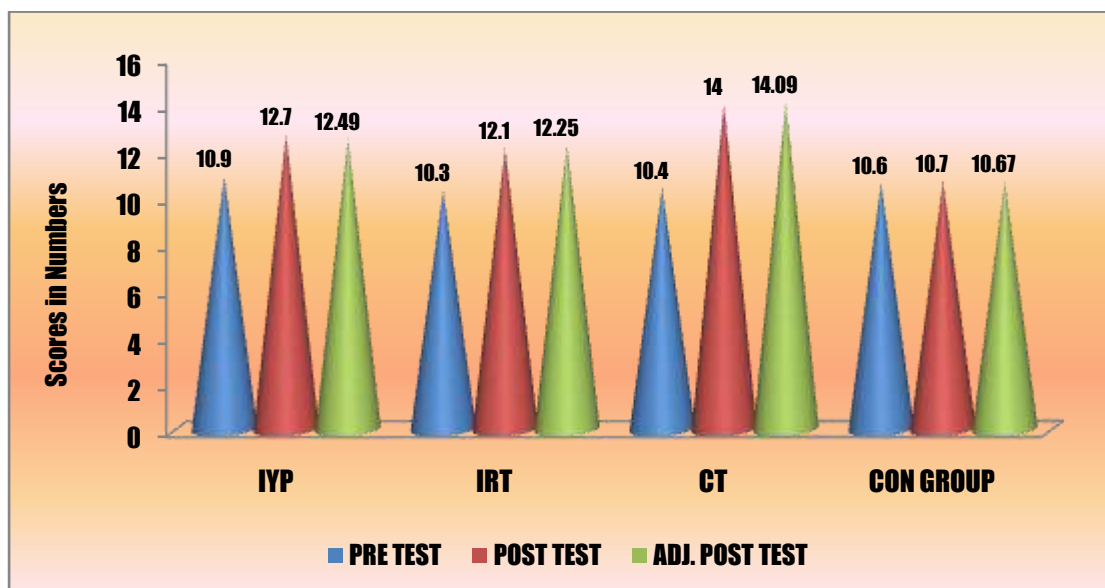
* Significant at 0.05 level.

Table XXV shows the Scheffe's Post Hoc Test of ordered adjusted final means difference of vigour of different groups. The comparison between the Control Group and isolated yogic practices was 1.82, the comparison between the Control Group and isolated resistance training was 1.58, the comparison between the Control Group and combined training was 3.42, the comparison between the isolated yogic practices and isolated resistance training was 0.24, the comparison between the isolated yogic practices and combined training was 1.60, and the comparison between the isolated resistance training and combined training was 1.84.

The obtained mean difference of the above comparison was 1.82, 1.58, 3.42, 0.24, 1.60 and 1.84 respectively. The table confidence interval was 1.10 at 0.05 levels. Hence, all the comparisons were significant, except fourth comparison.

The pre, post and adjusted post test means of vigour were presented through bar diagram for better understanding of the results of this study in figure -9.

FIGURE 9
BAR DIAGRAM SHOWING THE PRE, POST AND ADJUSTED POST TEST
MEANS OF VIGOUR
(Scores in numbers)



4.12.2 DISCUSSION ON THE FINDINGS OF VIGOUR

In this work, the analysis of covariance of vigour was carried out in different Experimental Groups with the inclusion of combined, isolated yogic practices and isolated resistance training. The same analysis was carried out in another group called the Control Group without inclusion of training. From these analyses, it was found that the results obtained from the Experimental Groups had significant increases in the vigour when compared with one from the Control Group. This was due to the influence of combined, isolated yogic practices and isolated resistance training in the analysis of experimental groups. It was interesting to note that the results obtained from combined training had more significant effect than isolated yogic practices and isolated resistance training on the increased vigour. Further, the results obtained from isolated yogic practices and isolated resistance training had significant influenced on vigour than the Control Group. A researcher conducted eight weeks of training such as combined, isolated yogic practices and isolated resistance training to increase the vigour.

These results were found to be in a good agreement with the earlier works done by different researchers. The findings of Timlin and Simpson (2017) established yoga intervention group had improved psychological wellbeing as indicated by reductions in stress and increases in vigour.

Since the results obtained from the analysis of covariance in very good agreement with the earlier results, it was worthwhile to mention that combined training is one of the better training methods to increase the vigour. This, in turn, helps to be healthy to the postpartum women.

4.13 COMPUTATION OF ANALYSIS OF COVARIANCE OF FATIGUE

The following tables illustrated the statistical results to the combined, isolated yogic practices and isolated resistance training on fatigue among postpartum women and ordered adjusted means the groups under study.

TABLE XXVI
COMPUTATION OF ANALYSIS OF COVARIANCE ON FATIGUE
(Scores in numbers)

Means	IYP	IRT	CT	Control Group	SV	SS	df	MS	Obtained 'F'
Pre test	14.10	14.10	14	14.20	B	0.20	3	0.07	0.03
					W	79.40	36	2.21	
Post test	12.80	12.20	11	14.20	B	53.10	3	17.70	13.62*
					W	46.80	36	1.30	
Adjusted post test	12.80	12.20	11.05	14.15	B	49.53	3	16.51	25.28*
					W	22.86	35	0.65	

*Significant. F ratio for 3 and 36 = 2.87 and 3 and 35 = 2.87 (0.05 level)

4.13.1 RESULTS OF FATIGUE

Table XXVI shows analyzed data on fatigue. The pre test means of fatigue were 14.10 for isolated yogic practices, 14.10 for isolated resistance training, 14 for combined training and 14.20 for Control Group. The obtained 'F' ratio 0.03 was lesser than the table 'F' ratio 2.87. Hence, the pre test was not significant at 0.05 level of confidence for degrees of freedom 3 and 36. This proved that there was no significant difference between experimental and control groups indicating that the process of randomization of the groups was perfect while assigning the subjects to groups.

The post test means were 12.80 for isolated yogic practices, 12.20 for isolated resistance training, 11 for combined training and 14.20 for Control Group. The obtained 'F' ratio 13.62 was higher than the table 'F' ratio 2.87. Hence, post test was significant at 0.05 level of confidence for the degrees of freedom 3 and 36. This proved that the differences among the post test means of the groups were significant.

The adjusted post test means were 12.80 for isolated yogic practices, 12.20 for isolated resistance training, 11.05 for combined training and 14.15 for Control Group. The obtained 'F' ratio 25.28 was higher than the table 'F' ratio 2.87. Hence, adjusted post test was significant at 0.05 level for the degrees of freedom 3 and 35. This proved that there was significant difference among means due to the combined, isolated yogic practices and isolated resistance training on fatigue. To find out the paired mean difference between groups, Scheffe's Post Hoc test was applied. The outcome of the subsequent test is represented in the table - XXVII.

TABLE XXVII
COMPUTATION OF SCHEFFE'S POST HOC TEST ORDERED ADJUSTED
FINAL MEAN DIFFERENCE OF FATIGUE
 (Scores in numbers)

Control Group	Isolated Yogic Practices	Isolated Resistance Training	Combined Training	MD	CI
14.15	12.80	-	-	1.35*	1.06
14.15	-	12.20	-	1.95*	1.06
14.15	-	-	11.05	3.10*	1.06
-	12.80	12.20	-	0.60	1.06
-	12.80	-	11.05	1.75*	1.06
-	-	12.20	11.05	1.15*	1.06

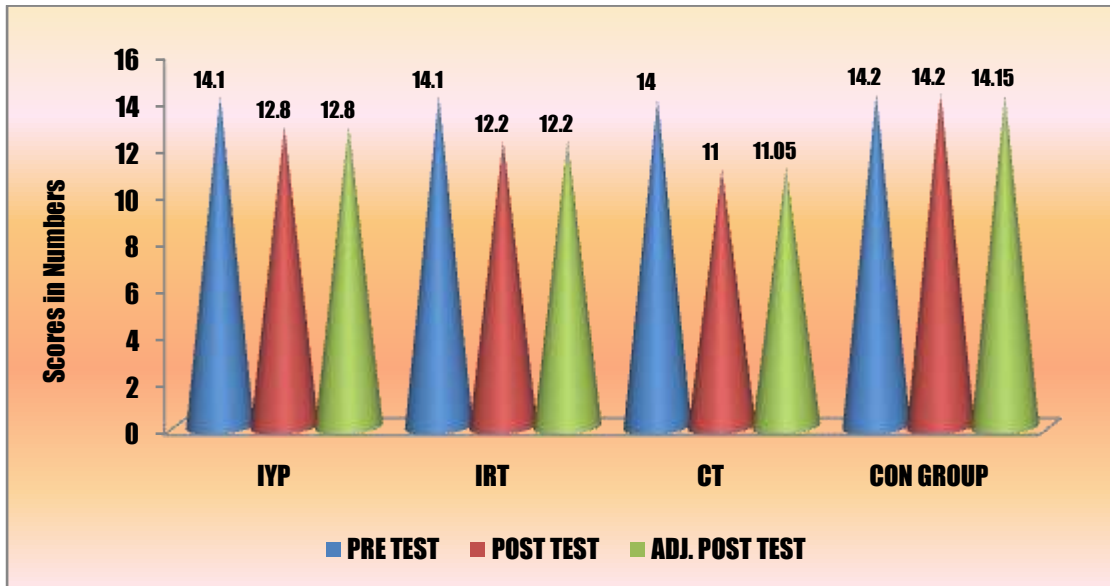
* Significant at 0.05 level.

Table XXVII shows the Scheffe's Post Hoc Test of ordered adjusted final means difference of fatigue of different groups. The comparison between the Control Group and isolated yogic practices was 1.35, the comparison between the Control Group and isolated resistance training was 1.95, the comparison between the Control Group and combined training was 3.10, the comparison between the isolated yogic practices and isolated resistance training was 0.60, the comparison between the isolated yogic practices and combined training was 1.75, and the comparison between the isolated resistance training and combined training was 1.15.

The obtained mean difference of the above comparison was 1.35, 1.95, 3.10, 0.60, 1.75 and 1.15 respectively. The table confidence interval was 1.06 at 0.05 levels. Hence, all the comparisons were significant, except fourth comparison.

The pre, post and adjusted post test means of fatigue were presented through bar diagram for better understanding of the results of this study in figure -10.

FIGURE 10
BAR DIAGRAM SHOWING THE PRE, POST AND ADJUSTED POST TEST
MEANS OF FATIGUE
(Scores in numbers)



4.13.2 DISCUSSION ON THE FINDINGS OF FATIGUE

In this work, the analysis of covariance of fatigue was carried out in different Experimental Groups with the inclusion of combined, isolated yogic practices and isolated resistance training. The same analysis was carried out in another group called the Control Group without inclusion of training. From these analyses, it was found that the results obtained from the Experimental Groups had significant decreases in the fatigue when compared with one from the Control Group. This was due to the influence of combined, isolated yogic practices and isolated resistance training in the analysis of experimental groups. It was interesting to note that the results obtained from combined training had more significant effect than isolated yogic practices and isolated resistance training on the decreased fatigue. Further, the results obtained from isolated yogic practices and isolated resistance training had significant influenced on fatigue than the Control Group. A researcher conducted eight weeks of training such as combined, isolated yogic practices and isolated resistance training to decrease the fatigue.

These results were found to be in a good agreement with the earlier works done by different researchers. The findings of Yang and Chen (2018) determined that aerobic gymnastic exercise improves stress, fatigue, sleep quality and depression in postpartum women.

Since the results obtained from the analysis of covariance in very good agreement with the earlier results, it was worthwhile to mention that combined training is one of the better training methods to increase the fatigue. This, in turn, helps to be healthy to the postpartum women.

4.14 COMPUTATION OF ANALYSIS OF COVARIANCE OF CONFUSION

The following tables illustrated the statistical results to the combined, isolated yogic practices and isolated resistance training on confusion among postpartum women and ordered adjusted means the groups under study.

TABLE XXVIII
COMPUTATION OF ANALYSIS OF COVARIANCE ON CONFUSION
(Scores in numbers)

Means	IYP	IRT	CT	Control Group	SV	SS	df	MS	Obtained 'F'
Pre test	12.60	12.20	13.30	12	B	9.88	3	3.29	1.29
					W	92.10	36	2.56	
Post test	10.40	10.50	9.80	12.20	B	31.88	3	10.63	8.30*
					W	46.10	36	1.28	
Adjusted post test	10.36	10.68	9.36	12.50	B	47.47	3	15.82	33.53*
					W	16.51	35	0.47	

*Significant. F ratio for 3 and 36 = 2.87 and 3 and 35 = 2.87 (0.05 level)

4.14.1 RESULTS OF CONFUSION

Table XXVIII shows analyzed data on confusion. The pre test means of confusion were 12.60 for isolated yogic practices, 12.20 for isolated resistance training, 13.30 for combined training and 12 for Control Group. The obtained 'F' ratio 1.29 was lesser than the table 'F' ratio 2.87. Hence, the pre test was not significant at 0.05 level of confidence for degrees of freedom 3 and 36. This proved that there was no significant difference between experimental and control groups indicating that the process of randomization of the groups was perfect while assigning the subjects to groups.

The post test means were 10.40 for isolated yogic practices, 10.50 for isolated resistance training, 9.80 for combined training and 12.20 for Control Group. The obtained 'F' ratio 8.30 was higher than the table 'F' ratio 2.87. Hence, post test was

significant at 0.05 level of confidence for the degrees of freedom 3 and 36. This proved that the differences among the post test means of the groups were significant.

The adjusted post test means were 10.36 for isolated yogic practices, 10.68 for isolated resistance training, 9.36 for combined training and 12.50 for Control Group. The obtained 'F' ratio 33.53 was higher than the table 'F' ratio 2.87. Hence, adjusted post test was significant at 0.05 level for the degrees of freedom 3 and 35. This proved that there was significant difference among means due to the combined, isolated yogic practices and isolated resistance training on confusion. To find out the paired mean difference between groups, Scheffe's Post Hoc test was applied. The outcome of the subsequent test is represented in the table - XXIX.

TABLE XXIX
COMPUTATION OF SCHEFFE'S POST HOC TEST ORDERED ADJUSTED
FINAL MEAN DIFFERENCE OF CONFUSION
(Scores in numbers)

Control Group	Isolated Yogic Practices	Isolated Resistance Training	Combined Training	MD	CI
12.50	10.36	-	-	2.14*	0.90
12.50	-	10.68	-	1.82*	0.90
12.50	-	-	9.36	3.14*	0.90
-	10.36	10.68	-	0.32	0.90
-	10.36	-	9.36	1*	0.90
-	-	10.68	9.36	1.32*	0.90

* Significant at 0.05 level.

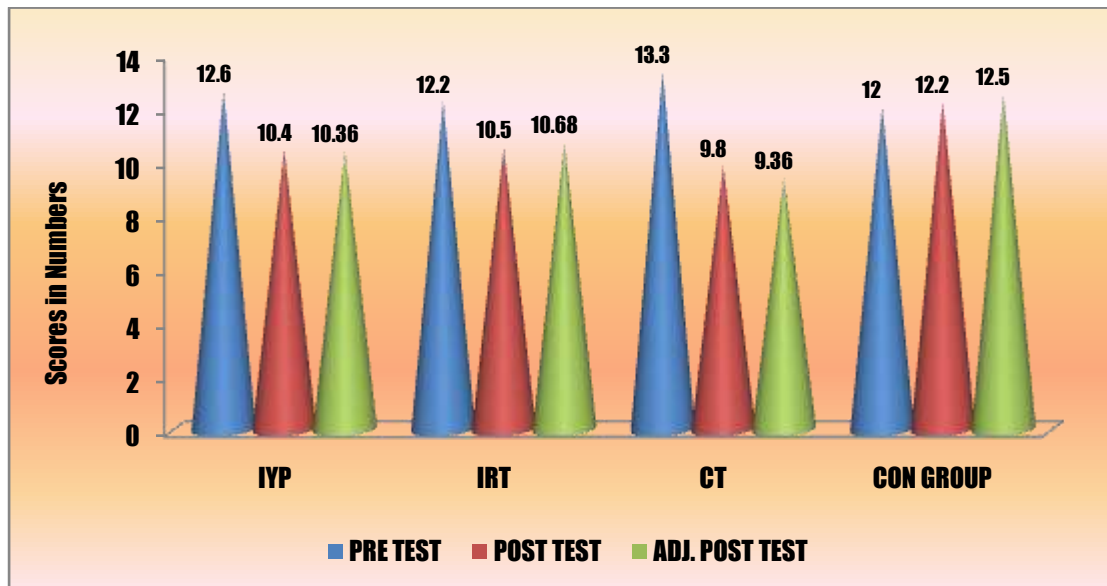
Table XXIX shows the Scheffe's Post Hoc Test of ordered adjusted final means difference of confusion of different groups. The comparison between the Control Group and isolated yogic practices was 2.14, the comparison between the Control Group and isolated resistance training was 1.82, the comparison between the Control Group and combined training was 3.14, the comparison between the isolated yogic practices and isolated resistance training was 0.32, the comparison between the

isolated yogic practices and combined training was 1, and the comparison between the isolated resistance training and combined training was 1.32.

The obtained mean difference of the above comparison was 2.14, 1.82, 3.14, 0.32, 1 and 1.32 respectively. The table confidence interval was 2.94 at 0.05 levels. Hence, all the comparisons were significant, except fourth comparison.

The pre, post and adjusted post test means of confusion were presented through bar diagram for better understanding of the results of this study in figure -11.

FIGURE 11
BAR DIAGRAM SHOWING THE PRE, POST AND ADJUSTED POST TEST
MEANS OF CONFUSION
(Scores in numbers)



4.14.2 DISCUSSION ON THE FINDINGS OF CONFUSION

In this work, the analysis of covariance of confusion was carried out in different Experimental Groups with the inclusion of combined, isolated yogic practices and isolated resistance training. The same analysis was carried out in another group called the Control Group without inclusion of training. From these analyses, it was found that the results obtained from the Experimental Groups had significant decreases in the confusion when compared with one from the Control Group. This was due to the influence of combined, isolated yogic practices and isolated resistance training in the analysis of experimental groups. It was interesting to note that the results obtained from combined training had more significant effect than isolated yogic practices and isolated resistance training on the decreased confusion. Further, the results obtained from isolated yogic practices and isolated resistance training had significant influenced on confusion than the Control Group. A researcher conducted eight weeks of training such as combined, isolated yogic practices and isolated resistance training to decrease the confusion.

These results were found to be in a good agreement with the earlier works done by different researchers. The findings of Pritchett, et al. (2017) provided support for the effectiveness of exercise in reducing postpartum depressive symptoms of confusion.

Since the results obtained from the analysis of covariance in very good agreement with the earlier results, it was worthwhile to mention that combined training is one of the better training methods to decrease the confusion. This, in turn, helps to be healthy to the postpartum women.

4.15 DISCUSSION HYPOTHESIS

1. The first hypothesis stated that there would be a significant improvement on selected physical, physiological and psychological variables among postpartum women due to combined and isolated yoga and resistance training.

The findings of this study showed that the improvement on selected physical variables such as abdominal strength and flexibility; physiological variables such as mean arterial blood pressure, forced vital capacity and breath holding time; psychological variables such as mood state and its sub scales of tension, depression, anger, vigour, fatigue and confusion due to the influence of eight weeks combined and isolated yoga and resistance training among postpartum women. Hence, the first hypothesis was accepted on the above said variables at 0.05 level of confidence except body mass index.

2. The second hypothesis stated that there would be significant differences between combined and isolated yogic practices and isolated resistance training groups in improving selected physical, physiological and psychological variables among postpartum women.

The findings of the study showed that significant differences between combined and isolated yogic practices and isolated resistance training groups in improving on selected physical variables such as abdominal strength and flexibility; physiological variables such as mean arterial blood pressure, forced vital capacity and breath holding time; psychological variables such as mood state and its sub scales of tension, depression, anger, vigour, fatigue and confusion. Hence, the second hypothesis was accepted on the above said variables at 0.05 level of confidence except body mass index.

3. The third hypothesized stated that comparing between treatment groups, namely, combined training would be significantly better than isolated yogic practices and isolated resistance training groups in altering selected physical, physiological and psychological variables of postpartum women comparing to control group.

The findings of the study showed that combined training had significant differences than isolated yogic practices and isolated resistance training groups on selected physical variable such as flexibility; physiological variables such as mean arterial blood pressure, forced vital capacity and breath holding time; psychological variables such as mood state and its sub scales of tension, depression, anger, vigour, fatigue and confusion. Hence, the third hypothesis was accepted on the above said variables at 0.05 level of confidence except body mass index.

CHAPTER - V

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.1 SUMMARY

Early postpartum period focuses on recovering from delivery and caring for the infant and the importance of resuming physical activity during this time is often not made clear to women, many of whom need guidance to begin or resume physical activity. This period is therefore often a missed life course opportunity for beginning or resuming physical activity. Previously active women who do not resume their pre-pregnancy physical activity levels may remain inactive for many years. For example, data from the Australian Longitudinal Study on Women's Health show a sharp decline in physical activity levels in the three years following the birth of a baby.

Muscle strengthening should be done two or more days per week. The guideline states that postpartum women may need extra precaution and should seek medical advice before striving to achieve these recommendations. Country-specific postpartum physical activity guidelines inform both health care providers and women about safe levels of physical activity during this unique time period.

Postpartum guidelines for physical activity should help women quickly achieve levels of physical activity that are commensurate with guidelines for all adults. Several attempts have been made by different researches to find out suitable physical activity guidelines for the benefit of postpartum women.

The study aims at finding out the effect of isolated and combined effect of yoga and resistance training on selected physical, physiological and psychological variables among postpartum women. In doing so, the study to assess selected physical,

physiological and psychological variables of postpartum women; to develop yogic practices and resistance exercises beneficial for postpartum women; experiment with combined and isolated yoga and resistance training among postpartum women and to find out the influences of experimental treatments on selected physical, physiological and psychological variables compared to control group and within the experimental groups.

The purpose of the study was to find out the combined and isolated effect of yoga and resistance training on selected physical, physiological, psychological variables among postpartum women. To facilitate the study forty women who have given birth of normal delivery, at Hospitals, Bangalore, Karnataka state have been enrolled as subjects with their consent. The women were in the upper age limit of 35 years and willing to participate in the study because of its usefulness. The selected subjects were assigned into four groups of ten in each. Experimental group I, II and III were isolated yogic practices, isolated resistance training and combination of yogic practices and resistance training respectively. The fourth group served as control group which was not given any special treatment. The requirements of the experimental procedures, testing as well as exercise schedules were explained to them so as to avoid any ambiguity of the effort required on their part and prior to the administration of the study, the investigator got the individual consent from each subject. Taking into consideration of feasibility criteria, availability of instruments and the relevance of the variables of the present study, the following physical variables such as flexibility and body mass index; physiological variables such as mean arterial blood pressure, forced vital capacity and breath holding time; psychological variables such as tension, depression, anger, vigour, fatigue and confusion were selected.

The study was formulated as a true random group design, consisting of a pre test and post test. The subjects (n=40) were randomly assigned to four equal groups of ten in each group. The groups were assigned as Experimental Groups I, II, III and control group respectively. Pre tests were conducted for all the subjects on selected physical, physiological and psychological variables, such as flexibility, body mass index, mean arterial blood pressure, breath holding time forced vital capacity and mood swing consisting of six scales. A pilot study was conducted to assess the initial capacity of the subjects in order to fix the exercise load. For this purpose nine postpartum women who were not the subjects of this study were selected and administered isolated yogic practices, isolated resistance training and combined yoga and resistance exercises. The training schedules for group I, II and III were constructed based on the outcome of pilot study. The experimental groups participated in their respective experimental treatments, namely, isolated yogic practices, isolated resistance training and combined yogic practices and resistance training for period of eight weeks. The post tests were conducted on the above said dependent variables after a period of eight weeks of experimental treatments for the groups. The difference between initial and final scores on selected criterion variables was considered as the effect of the respective experimental treatment. The obtained data was subjected to statistical treatment using ANCOVA. In all cases 0.05 level was fixed to test the hypothesis.

5.2 CONCLUSIONS

Within the limitations and delimitations of the study, the following conclusions were drawn:

1. It was concluded that there were improvement on selected physical variables such as flexibility; physiological variables such as mean arterial blood pressure, forced vital capacity and breath holding time; psychological variables such as mood state and its sub scales of tension, depression, anger, vigour, fatigue and confusion due to the influence of eight weeks combined and isolated yogic practices and isolated resistance training among postpartum women.
2. It was concluded that the significant differences between combined and isolated yogic practices and isolated resistance training groups in altered on selected physical variables such as flexibility; physiological variables such as mean arterial blood pressure, forced vital capacity and breath holding time; psychological variables such as mood state and its sub scales of tension, depression, anger, vigour, fatigue and confusion. It was found that combined, isolated yogic practices and isolated resistance training group were significantly better than the control group among postpartum women.
3. It was concluded that combined training significantly alerted physical variable such as flexibility; physiological variables such as mean arterial blood pressure, forced vital capacity and breath holding time; psychological variables such as mood state and its sub scales of tension, depression, anger, vigour, fatigue and confusion than isolated yogic practices and isolated resistance training. It was

found that isolated yogic practices and isolated resistance training group were significantly better than the control group among postpartum women.

5.3 RECOMMENDATIONS

The findings of the study proved that combined and isolated yoga and resistance training contributed for beneficially alter selected physical fitness, physiological and psychological variables of postpartum women. In view of these findings the following are recommended:

1. The beneficial effects of combined and isolated yoga and resistance training may be popularized among postpartum women.
2. Physicians and fitness trainers can suggest suitable physical exercise for all round development of physical, physiological and psychological levels of postpartum women.
3. The training schedules of yoga and resistance training may be adopted by postpartum women for speedy recovery and to lead healthy life.

5.4 SUGGESTIONS FOR FUTURE RESEARCH

During the course of the study, the investigator has come across a number of new ideas that can be looked into by future researchers. Some of the most important ones are listed below:

1. The effects of isolated yoga and resistance training on selected biochemical variables of postpartum women may be conducted.
2. A research with larger samples may be conducted to confirm the findings of the study.

3. Longitudinal researches may be undertaken to find out the effect of yoga and resistance training on selected physical fitness, physiological and psychological variables from pregnancy to postpartum periods.
4. A separate research may be conducted to find out women awareness on leading healthy life style through undergoing selected physical activities, which would be helpful to formulate suitable physical activities for women.

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APPENDIX - A
CONSENT TO PARTICIPATE VOLUNTARILY IN RESEARCH
INVESTIGATION

Tamil Nadu Physical Education and Sports University
Chennai - 600127

RESEARCH TITLE: “COMBINED AND ISOLATED EFFECT OF YOGA AND RESISTANCE TRAINING ON SELECTED PHYSICAL, PHYSIOLOGICAL AND PSYCHOLOGICAL VARIABLES AMONG POSTPARTUM WOMEN”.

Investigator’s Name: **Y. PAVANYABALAJI**

Supervisor: **Dr. Mrs. K. JOTHI**

Name of the Subject: _____

Name of Doctor (Gynecologist): _____

Name of Husband: _____

Address: _____

Email id: _____

Date of Birth: _____

Date of Delivery: _____

Normal / Cesarean: _____

Date of Discharge from Hospital: _____

I Mrs. _____ voluntarily take part in the research work during postpartum period conducted by the hospital.

Signature of the Husband

Signature of the Participant

APPENDIX - B
RAW SCORES ON FLEXIBILITY

S.No	Isolated Yogic Practices		Isolated Resistance Training		Combined Training		Control Group	
	Pre	Post	Pre	Post	Pre	Post	Pre	Post
1	2	5	3	5	3	8	3	4
2	3	6	1	5	2	7	4	5
3	1	6	2	4	3	8	2	4
4	3	7	3	5	2	6	3	4
5	4	7	2	4	4	7	4	5
6	2	5	4	7	2	7	3	3
7	3	6	3	5	3	6	3	3
8	2	5	2	3	4	7	4	4
9	2	5	4	6	3	8	2	3
10	3	6	3	5	2	6	3	3

APPENDIX - C
RAW SCORES ON BODY MASS INDEX

S.No	Isolated Yogic Practices		Isolated Resistance Training		Combined Training		Control Group	
	Pre	Post	Pre	Post	Pre	Post	Pre	Post
1	26.2	25.8	25.4	25.3	25.6	25.2	26.2	26.4
2	29.2	29.3	26.2	26.4	26.2	26.1	29.2	28.7
3	28.5	28.4	28.5	28.3	25.4	25.3	28.5	28.7
4	30.8	30.7	28.2	27.9	26.2	26	30.8	30.7
5	28.4	28.3	30.1	29.8	28.5	28.3	28.4	28.6
6	30.2	30.1	30.3	30.1	28.2	28.3	30.2	30.3
7	29.2	29.1	29.3	29.2	30.1	29.9	29.2	29.1
8	26.3	26.1	28.5	28.3	30.3	30.1	25.4	25.5
9	26.2	26	27.2	27	29.3	29.1	26.2	26.4
10	27.2	26.9	27.9	27.8	28.5	28.4	27.2	27.1

APPENDIX - D
RAW SCORES ON MEAN ARTERIAL BLOOD PRESSURE

S.No	Isolated Yogic Practices		Isolated Resistance Training		Combined Training		Control Group	
	Pre	Post	Pre	Post	Pre	Post	Pre	Post
1	102	99.5	100.5	98.5	101	94	102	105.2
2	105	99.2	105	98.5	100	94	101	101.5
3	100	99	102	97	103.5	97.5	98.5	104.5
4	99.5	98.5	98.2	97.2	102	97	101.5	99.5
5	101	99.5	103	97.2	106.2	96.5	104.5	103.5
6	99.5	98.5	101	96.2	101	95	100	101.5
7	107.2	102.3	98	100	99	94.5	94	95
8	100	97.5	100	97.3	98.5	96.2	99	102
9	107.5	106.3	98.5	97	102	94	99	101
10	103	101	103.3	99	105.2	97.5	105	102.5

APPENDIX - E
RAW SCORES ON FORCED VITAL CAPACITY

S.No	Isolated Yogic Practices		Isolated Resistance Training		Combined Training		Control Group	
	Pre	Post	Pre	Post	Pre	Post	Pre	Post
1	2550	2850	2350	2500	3000	3200	2750	2800
2	2700	2950	3250	3400	2450	2900	3000	3100
3	2250	2650	2350	2500	2350	2800	2850	2900
4	3250	3500	2450	2600	2850	3300	2450	2350
5	2450	2950	3250	3450	2950	3400	2650	2450
6	2650	2850	2850	2950	3050	3450	2400	2550
7	2750	3150	2850	3050	2650	3050	2650	2550
8	2850	3000	2350	2400	2350	3100	2400	2150
9	2550	3050	2650	2800	2250	2950	2650	2700
10	2250	2550	2550	2750	2450	3050	2350	2500

APPENDIX - F
RAW SCORES ON BREATH HOLDING TIME

S.No	Isolated Yogic Practices		Isolated Resistance Training		Combined Training		Control Group	
	Pre	Post	Pre	Post	Pre	Post	Pre	Post
1	48	51	50	51	42	56	50	43
2	51	53	45	47	45	55	46	45
3	45	52	47	48	47	51	42	44
4	43	48	49	50	46	54	46	45
5	47	50	43	45	48	52	48	46
6	46	49	45	46	44	49	43	48
7	48	51	48	52	47	53	46	49
8	44	49	49	51	49	55	48	48
9	48	52	46	48	47	53	50	47
10	50	54	42	45	45	54	46	43

APPENDIX - G
RAW SCORES ON TENSION

S.No	Isolated Yogic Practices		Isolated Resistance Training		Combined Training		Control Group	
	Pre	Post	Pre	Post	Pre	Post	Pre	Post
1	10	9	11	9	15	10	12	11
2	12	9	12	10	13	9	12	13
3	11	10	10	9	10	9	13	14
4	15	12	11	9	13	9	10	13
5	14	9	12	10	15	9	11	12
6	14	12	13	11	14	10	12	11
7	15	11	15	13	13	9	14	13
8	15	13	14	11	11	9	15	14
9	11	10	12	10	12	9	11	11
10	12	10	13	11	13	9	12	13

APPENDIX - H
RAW SCORES ON DEPRESSION

S.No	Isolated Yogic Practices		Isolated Resistance Training		Combined Training		Control Group	
	Pre	Post	Pre	Post	Pre	Post	Pre	Post
1	12	11	13	11	13	9	12	12
2	13	13	12	10	15	11	14	13
3	15	13	14	11	12	9	12	14
4	14	11	16	12	13	10	13	15
5	16	12	17	14	14	11	14	13
6	12	9	11	10	15	9	15	12
7	14	10	13	11	13	10	16	15
8	13	10	13	10	17	9	10	11
9	15	12	15	10	17	9	12	12
10	13	10	14	11	14	9	15	15

APPENDIX - I
RAW SCORES ON ANGER

S.No	Isolated Yogic Practices		Isolated Resistance Training		Combined Training		Control Group	
	Pre	Post	Pre	Post	Pre	Post	Pre	Post
1	15	13	14	13	12	10	12	14
2	14	12	16	12	13	9	13	15
3	16	13	17	14	14	10	14	13
4	12	11	11	10	15	12	15	16
5	14	13	13	11	13	9	16	15
6	16	13	17	14	14	10	14	13
7	12	11	11	10	15	11	15	16
8	14	13	13	11	13	10	16	15
9	13	12	13	12	10	9	10	11
10	15	13	15	13	17	14	12	12

APPENDIX - J
RAW SCORES ON VIGOUR

S.No	Isolated Yogic Practices		Isolated Resistance Training		Combined Training		Control Group	
	Pre	Post	Pre	Post	Pre	Post	Pre	Post
1	11	12	8	10	10	13	11	10
2	12	14	9	11	11	15	10	12
3	14	14	10	12	14	16	9	10
4	12	12	12	14	9	14	11	12
5	9	13	11	12	8	12	12	12
6	8	11	13	13	12	15	13	13
7	10	11	8	11	11	14	8	9
8	11	14	11	13	10	14	9	8
9	12	14	12	13	8	12	11	10
10	10	12	9	12	11	15	12	11

APPENDIX - K
RAW SCORES ON FATIGUE

S.No	Isolated Yogic Practices		Isolated Resistance Training		Combined Training		Control Group	
	Pre	Post	Pre	Post	Pre	Post	Pre	Post
1	13	13	12	11	15	12	14	13
2	15	13	14	13	12	10	12	14
3	14	12	16	12	13	10	13	15
4	16	13	17	14	14	10	14	13
5	12	11	11	10	15	11	15	14
6	14	13	13	11	13	11	16	15
7	13	12	13	12	14	10	14	14
8	15	14	14	13	13	11	13	13
9	16	15	16	14	15	13	15	16
10	13	12	15	12	16	12	16	15

APPENDIX - L
RAW SCORES ON CONFUSION

S.No	Isolated Yogic Practices		Isolated Resistance Training		Combined Training		Control Group	
	Pre	Post	Pre	Post	Pre	Post	Pre	Post
1	11	10	10	9	11	9	11	10
2	12	10	11	9	13	9	12	10
3	14	11	12	10	15	10	14	11
4	14	11	13	11	14	11	14	11
5	15	10	15	13	13	10	15	10
6	11	10	10	9	12	9	11	10
7	11	10	11	10	13	10	11	10
8	14	11	12	10	15	11	14	11
9	14	12	13	11	14	10	14	12
10	10	9	15	13	13	9	10	9

APPENDIX - M

QUESTIONNAIRE TO ASSESS MOOD

The Brunel Scale

Name: _____ Sex : M / F Age: _____ Year: _____

Below is a list of words that describe feelings people have. Please read each one carefully. Then tick the answers which best describes HOW YOU FEEL RIGHT NOW. Make sure you answer every question:

S.No.	Question	Not at all	A little	Moderately	Quite a bit	Extremely
1	Panickey	0	1	2	3	4
2	Sad	0	1	2	3	4
3	Lively	0	1	2	3	4
4	Confused	0	1	2	3	4
5	Furious	0	1	2	3	4
6	Worn Out	0	1	2	3	4
7	Depressed	0	1	2	3	4
8	Downhearted	0	1	2	3	4
9	Annoyed	0	1	2	3	4
10	Exhausted	0	1	2	3	4
11	Mixed up	0	1	2	3	4
12	Sleepy	0	1	2	3	4
13	Bitter	0	1	2	3	4
14	Unhappy	0	1	2	3	4
15	Anxious	0	1	2	3	4
16	Worried	0	1	2	3	4
17	Energetic	0	1	2	3	4
18	Miserable	0	1	2	3	4
19	Muddled	0	1	2	3	4
20	Nervous	0	1	2	3	4
21	Angry	0	1	2	3	4
22	Active	0	1	2	3	4
23	Tired	0	1	2	3	4
24	Bad Tempered	0	1	2	3	4
25	Bushed	0	1	2	3	4
26	Alert	0	1	2	3	4
27	Uncertain	0	1	2	3	4

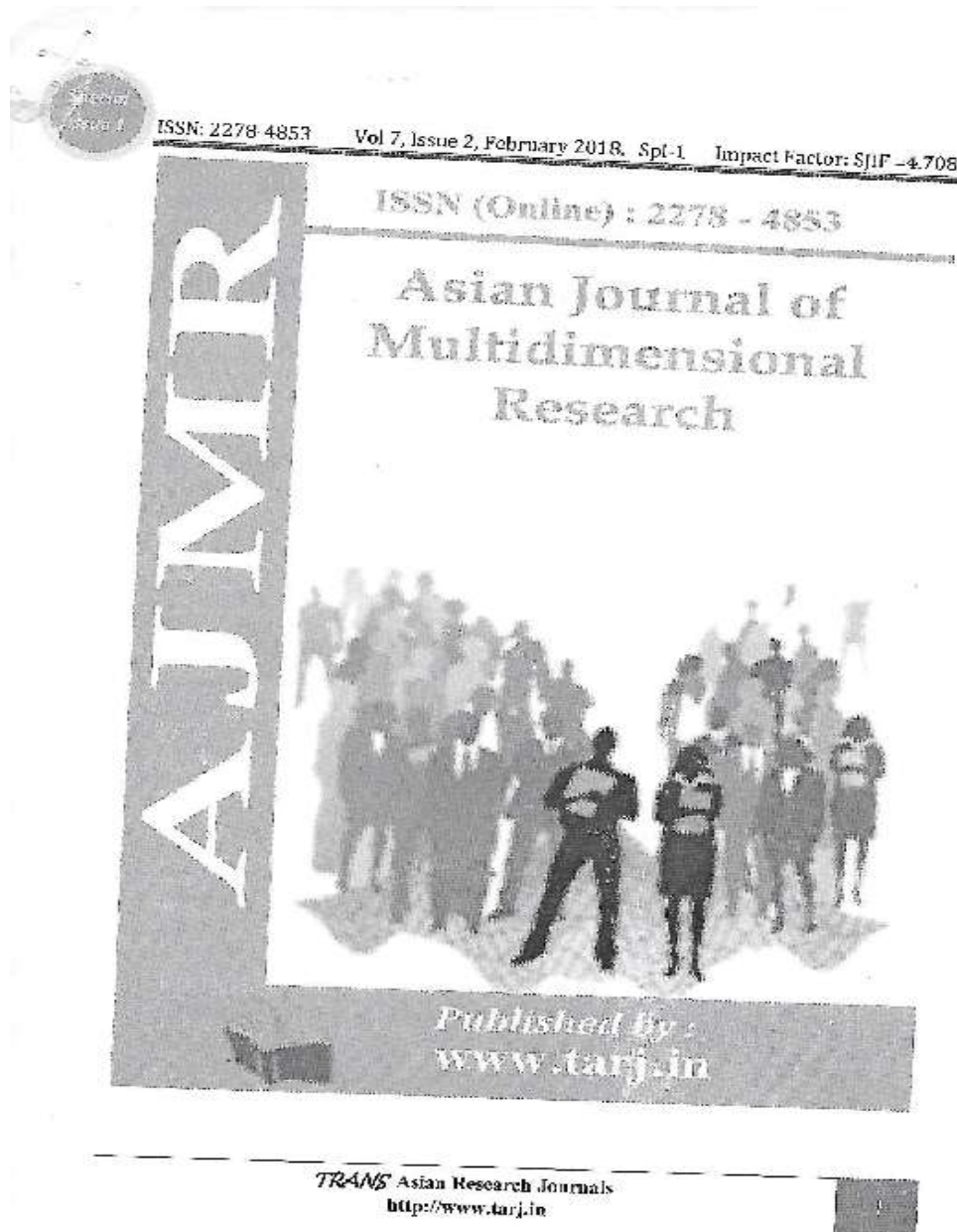
REPRINT - A

**EFFECT OF YOGIC PRACTICES ON SELECTED PHYSIOLOGICAL
VARIABLES AMONG POSTPARTUM WOMEN**

JOURNAL

ASIAN JOURNAL OF MULTIDIMENSIONAL RESEARCH

ISSN (Online): 2778-4853, Vol. 7, Issue 2



55.	ADAPTED RECREATIONAL GAMES FOR CHILDREN WITH VISUAL IMPAI-RM Dr.S.Revathi	381-384
56.	EFFECT OF YOGIC PRACTICES ON SELECTED PHYSIOLOGICAL VARIABLES AMONG POSTPARTUM WOMEN Y.Pavanya Balaji, Dr.K.JothiDayanandan	385-388
57.	COMPARISON OF SELECTED PHYSIOLOGICAL AND GAME RELATED PHYSICAL FITNESS VARIABLES OF RUNNER AND CHASER OF KHO-KHO N.Mekala, Dr.P. Anbalagan	389-392
58.	MOTIVATION FOR MATHEMATICS ADOPTED IN HR. SEC. EDUCATION V. Kiruthika Rani , Dr. P. Sattanathan	393-398
59.	A STUDY ON ENERGY BALANCE AND NUTRIENT INTAKE OF WATER SPORTS PLAYERS OF SPECIAL AREA GAMES CENTRE, ALLEPPEY, KERALA OF SPORTS AUTHORITY OF INDIA Aishwarya, R	399-410
60.	INCLUSIVE DESIGN IN SPORTS FOR THE VISUALLY IMPAIRED Dr. D. Nirupalini	411-415
61.	ASSOCIATION AMONG SPEED AGILITY DRIBBLING AND FLAT FOOTIN SCHOOL LEVELHOCKEY PLAYERS J. Balaji, Y.Pavanya Balaji	416-419
62.	ROLE OF PHYSICAL EDUCATION RESEARCH ACTIVITIES AND THEIR IMPACT IN MODERN DAY LIFE Kumar.P, Ram Mohan Singh, Ratnakar A	420-425
63.	EFFECT OF MODERATE INTENSITY ENDURANCE AND HIGH INTENSITY INTERMITTENT TRAINING ON SELECTED EXPLOSIVE POWER OFMEN VOLLEYBALL PLAYERS V.Anbukumaran , Dr. V. Jeyaveerapandian	426-430
64.	PSYCHOLOGICAL PROBLEMS OF CHILDREN WITH LOCO-MOTOR DISABILITY Sona Mary John, Dr.M.Kasthuri	431-436



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Research (AJMR)**
(Double Blind Refereed & Reviewed International Journal)
UGC APPROVED JOURNAL



**EFFECT OF YOGIC PRACTICES ON SELECTED PHYSIOLOGICAL
VARIABLES AMONG POSTPARTUM WOMEN**

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ABSTRACT

The Purpose of the study was to find out the effect of yogic practices on selected physiological variables among postpartum women. To facilitate the study twenty postpartum women from govt. hospital from bangarupalyam in chittoor district were randomly selected as subjects and their age group was between 25to35 years. They were assigned into two groups of which one group served as yogic practices group and other group served as control group. The study was formulated as a true random groups design, consisting of pre-test and post-test. The subject (n=20) were randomly assigned to two groups of ten postpartum women in each. The groups were assigned as experimental group and control group respectively. Pre-test were conducted for all the subjects on selected physiological variables, namely mean arterial blood pressure and resting heart rate. The experimental groups underwent initial learning practices for a period of one week followed by respective yogic practices for a period of twelve weeks. The post-test were conducted on the above said dependent variables after a period of yogic practices. The difference between initial and final scores was considered as the effect of yogic practices. To collect and analyse the data dependent "t" Test was used. The results of the study proved that selected yogic practices significantly improved overall health and fitness of postpartum women, as assessed through physiological variables selected for the study.

KEYWORDS: Mean Arterial Blood pressure, Resting Heart Rate, Postpartum women.

INTRODUCTION

Postpartum women who constantly feel the threat of external stressors don't give their systems a chance to return to normal. Their adrenal glands become exhausted from constantly pumping adrenaline into the system; the digestive and immune systems remain sluggish. A consistent yoga practice goes a long way toward mitigating the effects of the fight-or-flight response by giving the body the opportunity to rest completely.

B.K.S. Iyengar, master of yoga's therapeutic applications, explains the benefits of yoga by means of what he calls its "squeezing and soaking" actions. He contends that through the process of squeezing out the old, stale blood or lymphatic fluids and soaking the area with fresh, oxygenated blood or fluids, yoga helps the body to utilize the nutrients it needs. A consistent yoga practice can give us confidence and stability as we move through the world. Yoga can improve posture and coordination, strengthen muscles, increase flexibility, and create balance. (Iyengar, 1992).

STATEMENT OF THE PROBLEM

The purpose of this study is to find out the effect of yogic practices on selected physiological variables among postpartum Women.

OBJECTIVE OF THE STUDY

Objective of the study was to find out whether there would be any significant difference on physiological variables among postpartum women due to yogic practices.

HYPOTHESIS

It was hypothesized that there would be a significant improvement on selected physiological variables due to yogic practices and pranayama among postpartum women.

REVIEW OF RELATED LITERATURE

Sharma G et al. (2014) a study to find out the effect of exercise program after delivery had a comparable reduction in diastasis recti as those who started the program during their pregnancy. A retrospective analysis was done of 63 women who trained prenatal or postnatal, engaging in isometric contractions of the transverse abdominals, resistance training, and cardiovascular exercise, with the same certified postnatal trainer. Both the prenatal and postnatal groups showed significant improvement ($P < .05$) in the reduction of postnatal rectus abdominal muscle separation. There was no significant difference in the final absolute separation measurement of the two groups. Women who started after delivery an exercise program aimed at reducing diastasis recti achieved the same reduction in diastasis recti as those who started the program during pregnancy.

MohammadiF et al. (2014) determined the effectiveness of home-based low-intensity stretching and breathing exercises on the reduction of 1 and 2 month post-partum depression (primary outcome) and fatigue (secondary outcome) scores. This study did not provide evidence to show that training women to do the home-based exercises during pregnancy or during pregnancy and post-partum period have a preventive effect on post-partum depression and fatigue.

METHODOLOGY

To facilitate the study twenty postpartum women from govt. hospital from bangarupalyam in chittoor district were randomly selected as subjects under the supervision of medically qualified and experienced obstetrician and gynaecologist. All subjects filled in an Informed Consent Form to participate voluntarily in the investigation with an age group of 25 to 35 years. They were assigned into two groups of which one group served as yogic practices and pranayama group and other group served as control group. The study was formulated as a true random groups design, consisting of pre-test and post-test. The subject (n=20) were randomly assigned to two groups of ten postpartum women in each.

The groups were assigned as experimental group I and control group II respectively. Pre-test were conducted for all the subjects on selected physiological variables, namely mean arterial blood pressure and resting heart rate. The experimental groups underwent initial learning practices for a period of one week followed by respective yogic practices and pranayama for a period of twelve weeks for 30 minutes and 3 minutes of rest in between. To collect and analyse the data dependent 't' Test was used.

RESULTS AND DISCUSSIONS

TABLE-I
ANALYSIS OF 'T' RATIO FOR THE PRE AND POST TEST OF CONTROL AND EXPERIMENTAL GROUP ON MEAN ARTERIAL BLOOD PRESSURE AND RESTING HEART RATE

Variable	Groups	Mean		SD		df	't' ratio
		Pre	Post	Pre	Post		
Mean Arterial Blood Pressure	Control	84.40	84.70	10.83	10.47	28	0.44
	Experimental	79.50	77.70	4.82	4.75		5.93*
Resting Heart Rate	Control	99.90	99.95	1.93	2.08	28	0.37
	Experimental	99.70	98.84	2.25	2.06		5.76*

*Significance at 0.05 level of confidence for 2 and 28 (df) = 2.10.

To find out difference between experimental and control group on mean arterial blood pressure difference in two group's t-ratio was employed and the level of significance was set at level 0.05. Experimental group pre and post-test mean value were 79.50, 77.70 respectively. In Control group pre and post-test were mean value was 84.40, 84.70 respectively. In experimental the obtained t-ratio was 5.93 greater than the table value 2.10 at 0.05 level of confidence, so it found to be significant. In control group the obtained t-ratio 0.44 was lesser than the table value 2.10 so it was found to be insignificant.

To find out difference between experimental and control group on resting heart rate difference in two group's t-ratio was employed and the level of significance was set at level 0.05. Experimental group pre and post-test mean value were 99.70, 98.84 respectively. In Control group pre and post-test were mean value was 99.90, 99.95 respectively. In experimental the obtained t-ratio was 5.76 greater than the table value 2.10 at 0.05 level of confidence, so it found to be significant. In control group the obtained t-ratio 0.37 was lesser than the table value 2.10 so it was found to be insignificant

CONCLUSION

1. It was concluded that there was significant improvement on mean arterial blood pressure due to yogic practices and pranayama among postpartum women.
2. It was concluded that there was significant improvement on Resting heart rate due to yogic practices and pranayama among postpartum women

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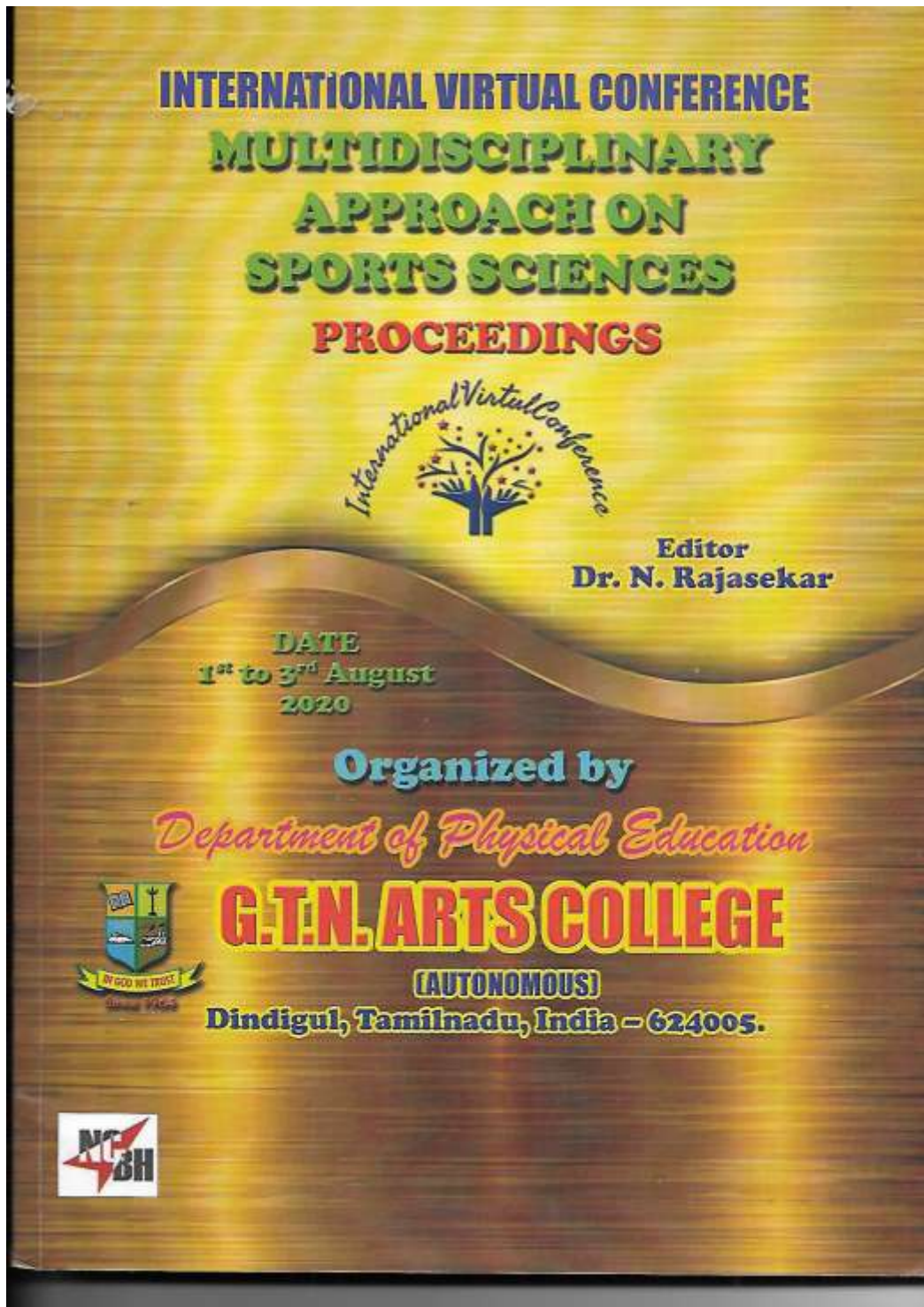
REPRINT - B

**EFFECT OF RESISTANCE TRAINING ON SELECTED PSYCHOLOGICAL
VARIABLES AMONG POSTPARTUM WOMEN**

JOURNAL

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APPROACH ON SPORTS SCIENCES

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30	Variations in Predicted Body Fat for the Same Sample Using Different Formulae - Mrs.S.Jeya Sarmila	65
31	Effect of Physical Training on Strength and Coordination of Dexterous Among School Handball Players - K. Kathiravan & Dr.s.vijay,	68
32	Fitness Programme for College Students and Common People during Pandemic Period - Dr.S.Somasundaramoorthy	71
33	Comparison of Selected Physiological Variables Among High School Boys of Different Ethnic Groups - Sreenivasa T,	73
34	A Comparative Study of Selected Motor Fitness Components Among Inter-College Level Karate and Taekwondo Athletes - T.Sudarsan & Dr.K.Murugavel	75
35	The Effect of Functional Circuit Training on Strength of College Students - Mr.P.Thangamuthu, & Dr. M. Muthuraj	77
36	Effect of Kinetic Band Training on Selected Physical Variables Among College Men Volleyball Players - V. Mohana Surenth & Dr.S.Vijaya Kumari	79
37	A Study to Analyze Correlation Between Fear of Fall and Proprioception, Functional Mobility, Flexibility, Balance and Ankle Range of Motion in Geriatric Population. - VadivelanSundaramurthy & Dr. Grace Helina	81
38	Normative Study of Physical Fitness for Matriculation School Girls - Vijayavel. T, & Dr. Baliram D, Lad	84
39	Effect of Resistant Training on Selected Psychological Variables among Postpartum Women - Y.PavanyaBalaji & Dr.K.JothiDayanandan	87
40	Effect Football Injuries and Prevention - Naveen Ram	89
41	Anterior Cruciate Ligament Injury Prevention - Ajmal Sheriff	91
42	Study on Balance Ability of The Players of Small Area Ball Games - Dr. Sandip Sankar Ghosh	94
43	Effect of Practicing Indigenous Game on Anaerobic Power of School Children - Dr. Tannoy Saha, Mr. Raju Biswas & Dr. Sandip Sankar Ghosh	96
44	Global Skills after Covid - 19 - Dr.Anitha Sa, Chaithanya D, & Dr. Sharmila G V	99
45	Effect of Land and Aquatic Plyometric trainings on Selected Physical Variables among Swimmers - Shalin Sathiah	101
46	A Relative Research of Self Efficacy Between Different Game Players (Contact and Non Contact) - Sandeep Singh	106
47	Influence of Asanas And Pranayama on Selected Physical and Physiological Variables Among College Women - C.Vijayalakshmi & Dr.S. Saroja	110

Effect of Resistant training on Selected Psychological variables among Postpartum Women

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INTRODUCTION

Postpartum women who constantly feel the threat of external stressors don't give their systems a chance to return to normal. Their adrenal glands become exhausted from constantly pumping adrenaline into the system; the digestive and immune systems remain sluggish. A consistent resistant training practice goes a long way toward mitigating the effects of the fight-or-flight response by giving the body opportunity to rest completely.

Resistance training, also known as strength training has gained great popularity in recent years, largely due to its appeal and positive impact on many diverse populations, such as athletic, recreational and clinical communities. Thus, resistance training programmes are used to achieve many different goals, such as performance improvement, injury rehabilitation, muscle tone improvement and strength improvement (American College of Sports Medicine, 2001). It emphasized that resistance training increases the concentration of various hormones and growth-promoting agents with the body that may contribute to this improved muscular strength and size.

STATEMENT OF THE PROBLEM

The purpose of this study is to find out the effect of resistant training on selected psychological variables among postpartum Women.

OBJECTIVE OF THE STUDY

Objective of the study is to find out whether there would be any significant difference on psychological variables among postpartum women due to resistant training.

HYPOTHESIS

It is hypothesized that there would be a significant improvement on selected psychological variables due to resistant training among postpartum women.

REVIEW OF RELATED LITERATURE

Sharma Getalu. (2014) a study to find out the effect of exercise program after delivery had a comparable reduction in diastasis recti as those who started the program during their pregnancy. A retrospective analysis was done of 63 women who trained prenatal or postnatal, engaging in isometric contractions of the transverse abdominals, resistance training, and cardiovascular exercise, with the

same certified postnatal trainer. Both the prenatal and postnatal groups showed significant improvement ($P < .05$) in the reduction of postnatal rectus abdominal muscle separation. There was no significant difference in the final absolute separation measurement of the two groups. Women who started after delivery an exercise program aimed at reducing diastasis recti achieved the same reduction in diastasis recti as those who started the program during pregnancy.

MohammadiF et al. (2014) determined the effectiveness of home-based low-intensity stretching and breathing exercises on the reduction of 1 and 2 month post-partum depression (primary outcome) and fatigue (secondary outcome) scores. This study did not provide evidence to show that training women to do the home-based exercises during pregnancy or during pregnancy and post-partum period have a preventive effect on post-partum depression and fatigue.

METHODOLOGY

To facilitate the study twenty postpartum women from govt. hospital from chittoor were randomly selected as subjects under the supervision of medically qualified and experienced obstetrician and gynecologist. All subjects filled in an Informed Consent Form to participate voluntarily in the investigation with an age group of 25to35years.The groups were assigned as experimental group I and control group II respectively. Pre-test were conducted for all the subjects on selected psychological variables, namely mood state and its subscales Depression, Fatigue. The experimental groups underwent initial learning practices for a period of one week followed by respective resistance training for a period of twelve weeks for 30Minutes and 3minutes of rest in between. To collect and analyse the data dependent 't' Test was used.

RESULTS AND DISCUSSIONS

TABLE-I
ANALYSIS OF 'T' RATIO FOR THE PRE AND POST TEST OF CONTROL AND EXPERIMENTAL GROUP ON DEPRESSION AND FATIGUE

Variable	Groups	Mean				t	p value
		Pre	Post	Pre	Post		
DEPRESSION	Control	54.98	52.78	50.47	50.87	0.66	
	Experimental	70.98	71.78	4.92	4.77	0.00*	
FATIGUE	Control	60.88	60.00	1.92	2.08	0.27	
	Experimental	69.70	68.84	2.20	2.08	0.79*	

*Significance at 0.05 level of confidence for 2 tail test ($P < 0.05$)

To find out difference between experimental and control group on depression difference in two groups t-ratio was employed and the level of significance was set at level 0.05. Experimental group pre and post-test mean value were 79.50, 77.70 respectively. In Control group pre and post-test were mean value was 84.40, 84.70 respectively. In experimental the obtained t-ratio was 5.93 greater than the table value 2.10 at 0.05 level of confidence, so it found to be significant. In control group the obtained t-ratio 0.44 was lesser than the table value 2.10 so it was found to be insignificant.

To find out difference between experimental and control group on fatigue difference in two group's t-ratio was employed and the level of significance was set at level 0.05. Experimental group pre and post-test mean value were 99.70, 98.84 respectively. In Control group pre and post-test were mean value was 99.90, 99.95 respectively. In experimental the obtained t-ratio was 5.76 greater than the table value 2.10 at 0.05 level of confidence, so it found to be significant. In control group the obtained t-ratio 0.37 was lesser than the table value 2.10 so it was found to be insignificant

Conclusion

1. It was concluded that there was significant improvement on depression due to resistance training among postpartum women.
2. It was concluded that there was significant improvement on fatigue due to resistance training among postpartum women.

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- Hale RW, Milne L. (1996) The elite athlete and exercise in pregnancy. *SeminPerinatol* 1996;20:277-284
- Koltyn KF, Schultes SS (1997). Psychological effects of an aerobic exercise session and a rest session following pregnancy. *J Sports Med Phys Fitness* 1997;37:287-291

**COMBINED AND ISOLATED EFFECT OF YOGA AND RESISTANCE TRAINING
ON SELECTED PHYSICAL PHYSIOLOGICAL AND PSYCHOLOGICAL
VARIABLES AMONG POSTPARTUM WOMEN**

SYNOPSIS

**of the Dissertation submitted to the Tamil Nadu Physical Education
and Sports University, Chennai for the fulfillment of the
requirement for the award of Degree of**

**DOCTOR OF PHILOSOPHY
IN
PHYSICAL EDUCATION**

**Submitted by
Y. PAVANYA BALAJI
(Reg NO: F1502PEPM047)**

**Under the Guidance of
Dr. Mrs. K. JOTHI**



**DEPARTMENT OF PHYSICAL EDUCATION
TAMIL NADU PHYSICAL EDUCATION AND SPORTS UNIVERSITY
CHENNAI - 600127
NOVEMBER – 2020**

An synopsis of the dissertation of **Y. PAVANYA BALAJI**, submitted for the degree of Doctor of Philosophy in Tamil Nadu Physical Education and Sports University, Chennai, November – 2020.

Title:

**“COMBINED AND ISOLATED EFFECT OF YOGA AND RESISTANCE TRAINING
ON SELECTED PHYSICAL PHYSIOLOGICAL AND PSYCHOLOGICAL
VARIABLES AMONG POSTPARTUM WOMEN”**

Approved by: _____

(Dr. Mrs. K. JOTHI)

INTRODUCTION

Early postpartum period focuses on recovering from delivery and caring for the infant and the importance of resuming physical activity during this time is often not made clear to women, many of whom need guidance to begin or resume physical activity. This period is therefore often a missed life course opportunity for beginning or resuming physical activity. Previously active women who do not resume their pre-pregnancy physical activity levels may remain inactive for many years. For example, data from the Australian Longitudinal Study on Women’s Health show a sharp decline in physical activity levels in the three years following the birth of a baby.

Muscle strengthening should be done two or more days per week. The guideline states that postpartum women may need extra precaution and should seek medical advice before striving to achieve these recommendations. Country-specific postpartum physical activity guidelines inform both health care providers and women about safe levels of physical activity during this unique time period.

Postpartum guidelines for physical activity should help women quickly achieve levels of physical activity that are commensurate with guidelines for all adults. Several attempts have been made by different researches to find out suitable physical activity guidelines for the benefit of postpartum women. However, there were little efforts made to find out the effect of yogic practices, resistance training and combined yoga and resistance exercises on selected physical, physiological and psychological variables among postpartum women.

STATEMENT OF THE PROBLEM

The purpose of this study was to assess the combined and isolated effect of yoga and resistance training on selected physical, physiological and psychological variables among postpartum women.

HYPOTHESES

1. It was hypothesised that there would be a significant improvement on selected physical, physiological and psychological variables among postpartum women due to combined and isolated yogic practices and isolated resistance training.
2. It was hypothesised that there would be a significant differences between combined and isolated yogic practices and isolated resistance training groups in improving selected physical, physiological and psychological variables among postpartum women.
3. It was hypothesized that comparing between treatment groups, namely, combined training would be significantly better than isolated yogic practices and isolated resistance training groups in altering selected physical, physiological and psychological variables of postpartum women comparing to control group.

DELIMITATIONS

The study would be further delimited in the following respects.

1. Forty postpartum women who gave normal birth at Hospitals, Bangalore, Karnataka State were selected for this study.
2. Randomly selected forty postpartum women in upper age limit 35 years were considered for this study.
3. The following dependent and independent variables were selected for this study,

DEPENDENT VARIABLES

Physical Variables

1. Flexibility
2. Body Mass Index

Physiological

1. Mean Arterial Blood Pressure
2. Forced vital capacity
3. Breath Holding time

Psychological Variables

1. Mood State and its sub scales such as Tension, Depression, Anger, Vigour, Fatigue and Confusion

INDEPENDENT VARIABLES

1. Experimental Group I - Yogic practices
2. Experimental Group II - Resistance training
3. Experimental Group III - Combined Training (Yogic practices and resistance training)

4. Control Group - No training

LIMITATIONS

The following limitations were considered while interpreting the results of the study.

1. The weather conditions such as atmospheric temperature, humidity, exposure of light and dark and meteorological factors during testing period were not considered.
2. Though the subjects were motivated verbally, no attempt was made to differentiate the motivation level during the period of testing.
3. No effort was made to control the nature of life style, nutritional status, the daily dietary intake, physiological factors and prescribed medicines that affect metabolic function.
4. Medications were not controlled.
5. The subjects were from different social, cultural and economic backgrounds.

METHODOLOGY

The study was formulated as a true random group design, consisting of a pre test and post test. The subjects (n=40) were randomly assigned to four equal groups of ten in each group. The groups were assigned as Experimental Groups I, II, III and control group respectively. Pre tests were conducted for all the subjects on selected physical, physiological and psychological variables, such as flexibility, body mass index, mean arterial blood pressure, breath holding time forced vital capacity and mood swing consisting of six scales. The experimental groups participated in their respective experimental treatments, namely, isolated yogic practices, isolated

resistance training and combined yogic practices and resistance training for period of eight weeks.

The post tests were conducted on the above said dependent variables after a period of eight weeks of experimental treatments for the groups. The difference between initial and final scores on selected criterion variables was considered as the effect of the respective experimental treatment. The obtained data was subjected to statistical treatment using ANCOVA. In all cases 0.05 level was fixed to test the hypotheses.

CRITERION MEASURES

By glancing the literature, and in consultation with professional experts, the following variables were selected as the criterion measures in this study.

1. Flexibility was measured through sit and reach test.
2. Body mass index was measured based on height and weight of the subjects.
3. Mean Arterial blood pressure was measured based on systolic and diastolic blood pressure measured using sphygmomanometer
4. Breath holding time was measured through nose and clip method
5. Forced vital capacity was measured through spirometer
6. Psychological variables mood swing subscales Tension, Depression, Anger, Vigour, Fatigue and Confusion were measured using standard questionnaire, the Brunel Scale.

COLLECTION OF DATA

The purpose of the study was to estimate the effects of combined and isolated yoga and resistance training among postpartum women on selected physical fitness, physiological and psychological variables. For this purpose, the research scholar followed the following procedure

The subjects of the study were selected at random and divided into four groups. Among the four groups, the control group was strictly under control, without undergoing any special activity. The experimental groups were undergone with the respective experimental treatments.

The experimental groups were well acquainted with their allotted techniques and did only the experimental treatment given to them for a period of six weeks under the personal supervision of the researcher.

STATISTICAL PROCEDURES

The data were analyzed by using Analysis of Covariance (ANCOVA) as recommended by **Clarke and Clarke (1972)** and **Best and Khan (1986)**. In all the cases 0.05 level was fixed as level of significance which was considered as appropriate. Since, four groups were compared, whenever obtained 'F' ratio for the adjusted post test was found to be significant, the Scheffe's test was applied as post hoc test to find out the paired mean differences, if any. In all cases, 0.05 level was fixed as level of confidence to test the significance which was considered as appropriate.

CONCLUSION

Within the limitations and delimitations of the study, the following conclusions were drawn:

1. It was concluded that there were improvement on selected physical variables such as flexibility; physiological variables such as mean arterial blood pressure, forced vital capacity and breath holding time; psychological variables such as mood state and its sub scales of tension, depression, anger, vigour, fatigue and confusion due to the influence of eight weeks combined and

isolated yogic practices and isolated resistance training among postpartum women.

2. It was concluded that the significant differences between combined and isolated yogic practices and isolated resistance training groups in altered on selected physical variables such as flexibility; physiological variables such as mean arterial blood pressure, forced vital capacity and breath holding time; psychological variables such as mood state and its sub scales of tension, depression, anger, vigour, fatigue and confusion. It was found that combined, isolated yogic practices and isolated resistance training group were significantly better than the control group among postpartum women.
3. It was concluded that combined training significantly alerted physical variable such as flexibility; physiological variables such as mean arterial blood pressure, forced vital capacity and breath holding time; psychological variables such as mood state and its sub scales of tension, depression, anger, vigour, fatigue and confusion than isolated yogic practices and isolated resistance training. It was found that isolated yogic practices and isolated resistance training group were significantly better than the control group among postpartum women.

RECOMMENDATIONS

The findings of the study proved that combined and isolated yoga and resistance training contributed for beneficially alter selected physical fitness, physiological and psychological variables of postpartum women. In view of these findings the following are recommended:

1. The beneficial effects of combined and isolated yoga and resistance training may be popularized among postpartum women.

2. Physicians and fitness trainers can suggest suitable physical exercise for all round development of physical, physiological and psychological levels of postpartum women.
3. The training schedules of yoga and resistance training may be adopted by postpartum women for speedy recovery and to lead healthy life.

SUGGESTIONS FOR FUTURE RESEARCH

During the course of the study, the investigator has come across a number of new ideas that can be looked into by future researchers. Some of the most important ones are listed below:

1. The effects of isolated yoga and resistance training on selected biochemical variables of postpartum women may be conducted.
2. A research with larger samples may be conducted to confirm the findings of the study.
3. Longitudinal researches may be undertaken to find out the effect of yoga and resistance training on selected physical fitness, physiological and psychological variables from pregnancy to postpartum periods.
4. A separate research may be conducted to find out women awareness on leading healthy life style through undergoing selected physical activities, which would be helpful to formulate suitable physical activities for women.

CHAPTER I

INTRODUCTION

CHAPTER II

REVIEW OF RELATED LITERATURE

CHAPTER III

METHODOLOGY

CHAPTER IV

ANALYSIS OF THE DATA AND RESULTS OF THE STUDY

CHAPTER V

SUMMARY CONCLUSIONS AND RECOMMENDATIONS

BIBLIOGRAPHY

APPENDICES

REPRINT

FIGURE 1
BAR DIAGRAM SHOWING THE PRE, POST AND ADJUSTED POST TEST
MEANS OF FLEXIBILITY
(Scores in centimeter)

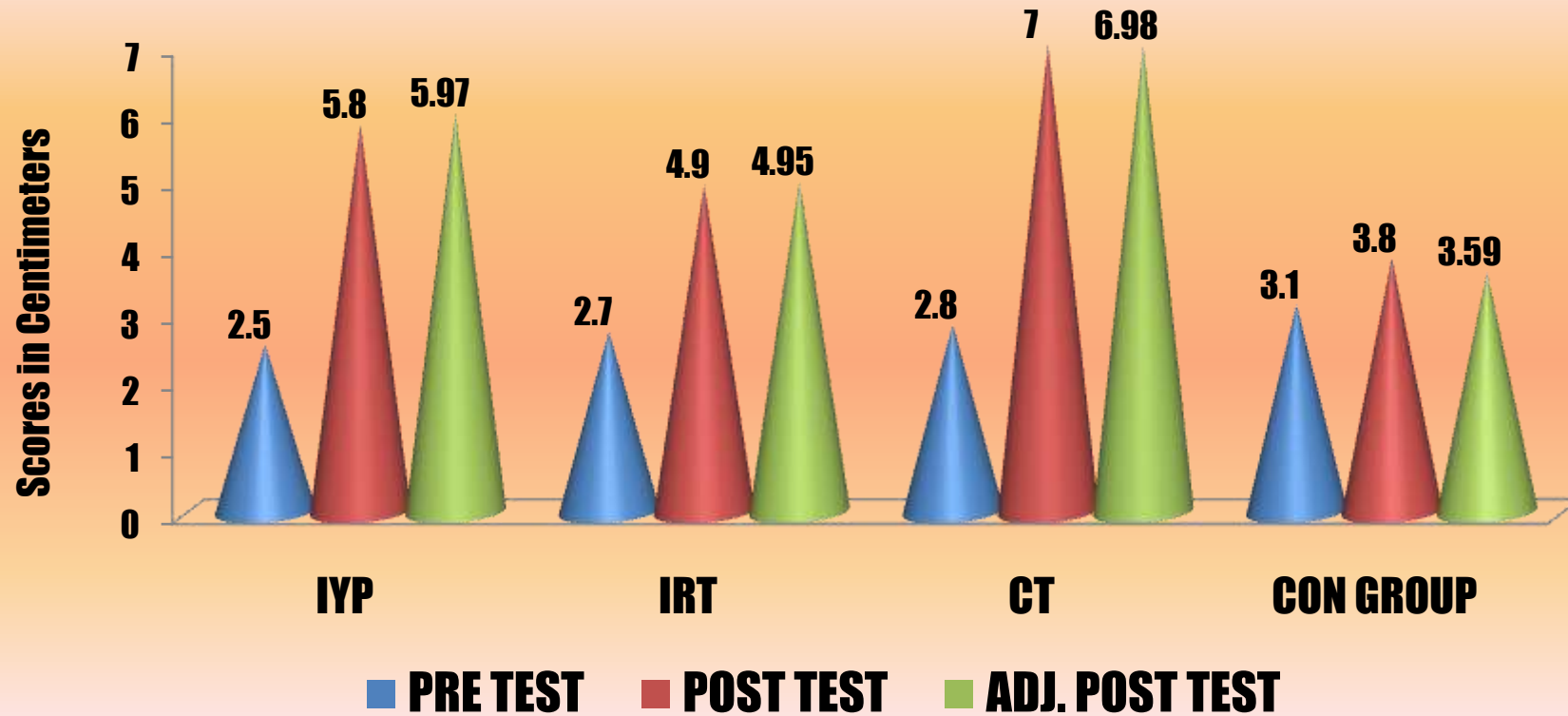


FIGURE 2
BAR DIAGRAM SHOWING THE PRE, POST AND ADJUSTED POST TEST
MEANS OF BODY MASS INDEX
 (Scores in Index Number)

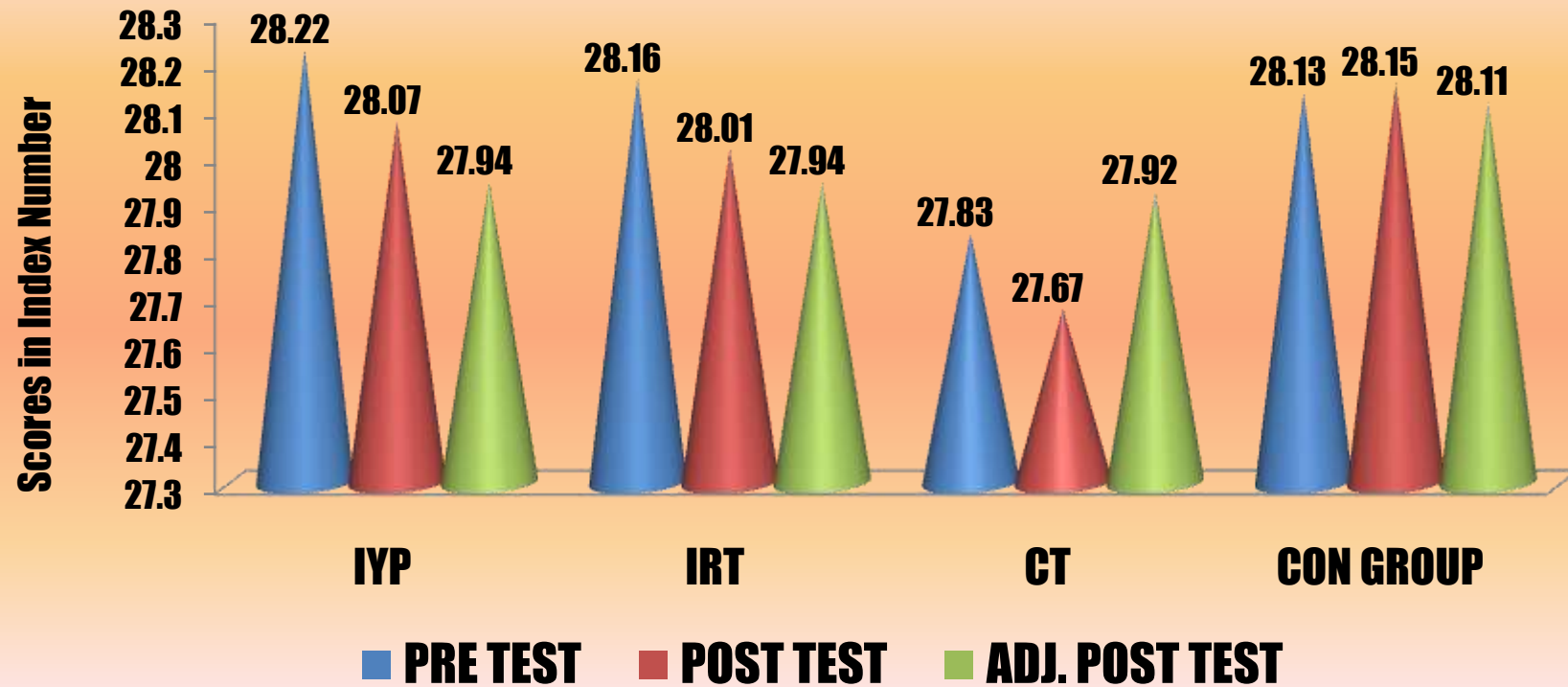


FIGURE 3
BAR DIAGRAM SHOWING THE PRE, POST AND ADJUSTED POST TEST
MEANS OF MEAN ARTERIAL BLOOD PRESSURE
(Scores in mm/Hg)

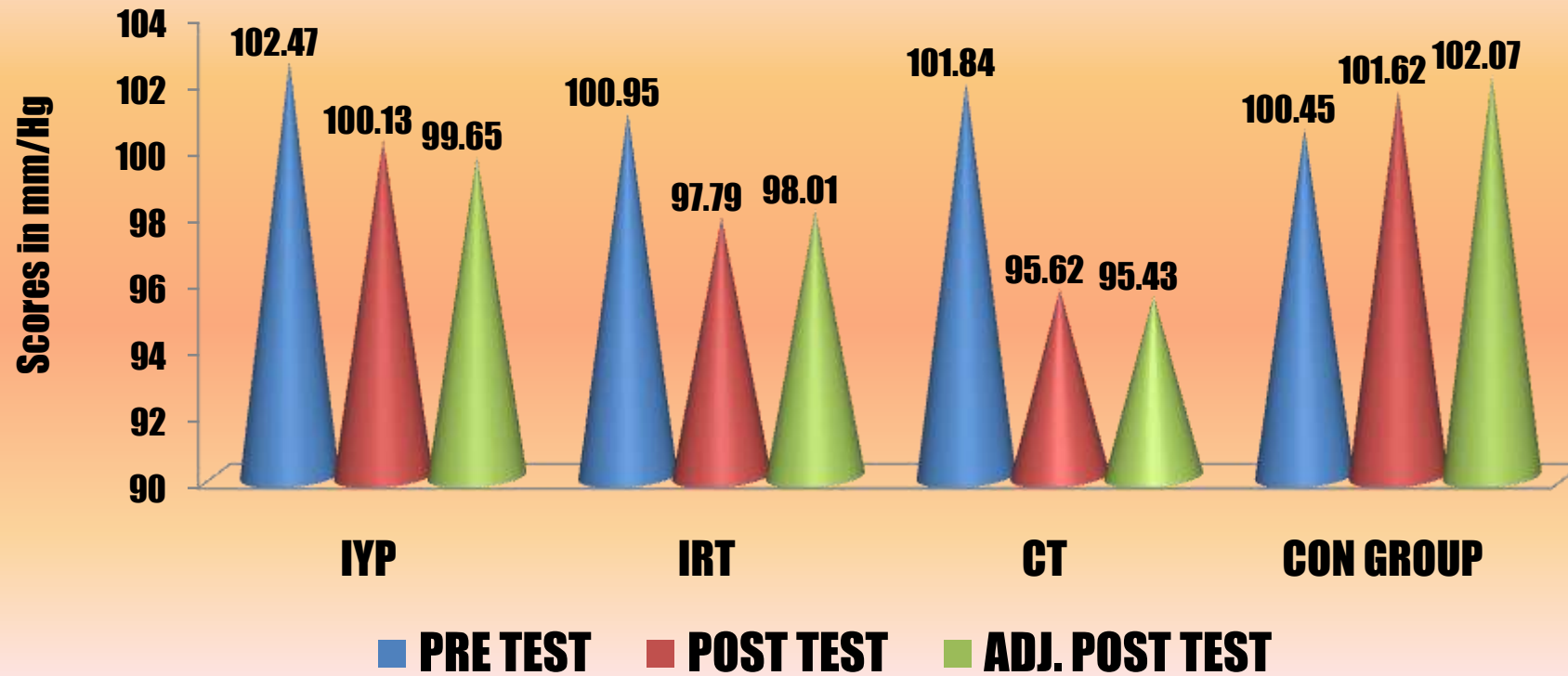


FIGURE 4
BAR DIAGRAM SHOWING THE PRE, POST AND ADJUSTED POST TEST
MEANS OF FORCED VITAL CAPACITY
(Scores in ml)

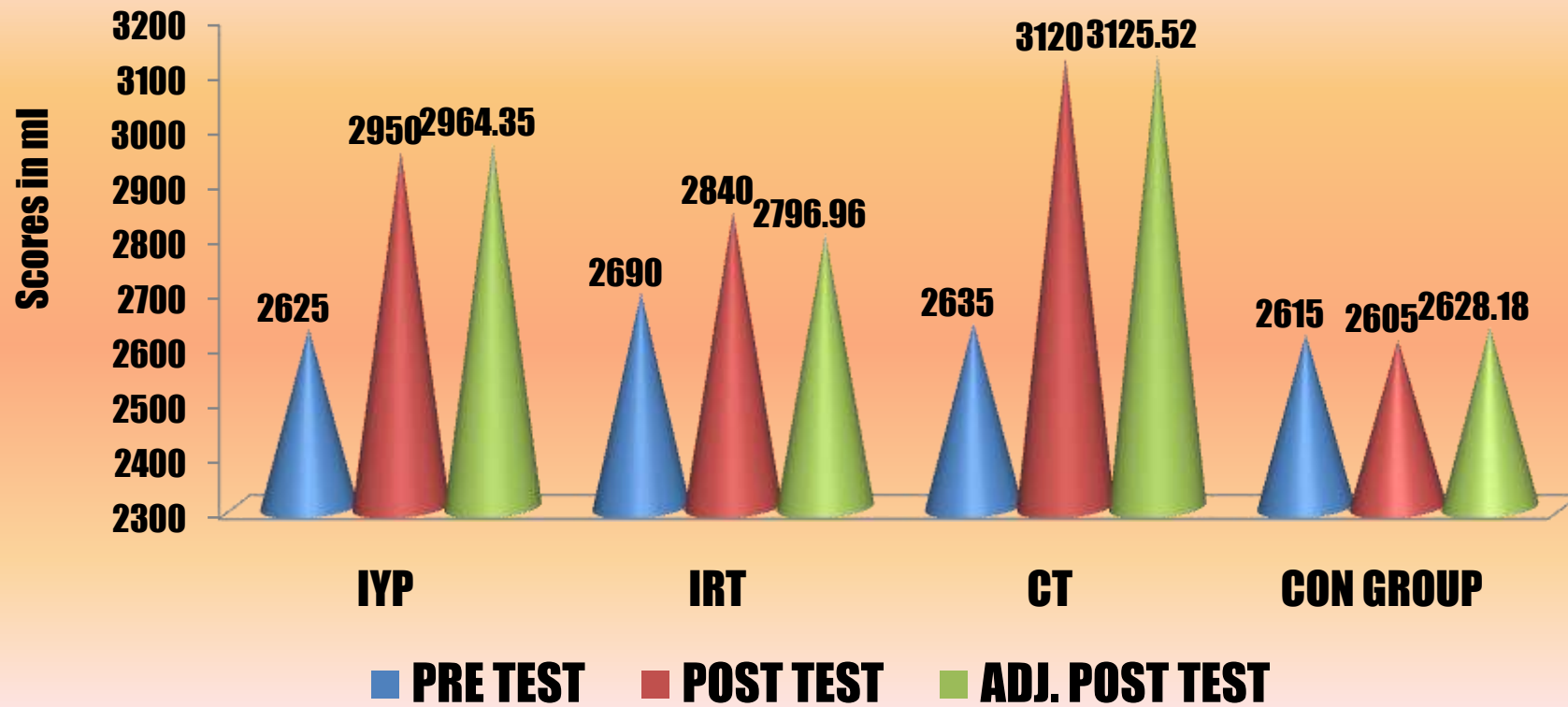


FIGURE 5
BAR DIAGRAM SHOWING THE PRE, POST AND ADJUSTED POST TEST
MEANS OF BREATH HOLDING TIME
(Scores in Seconds)

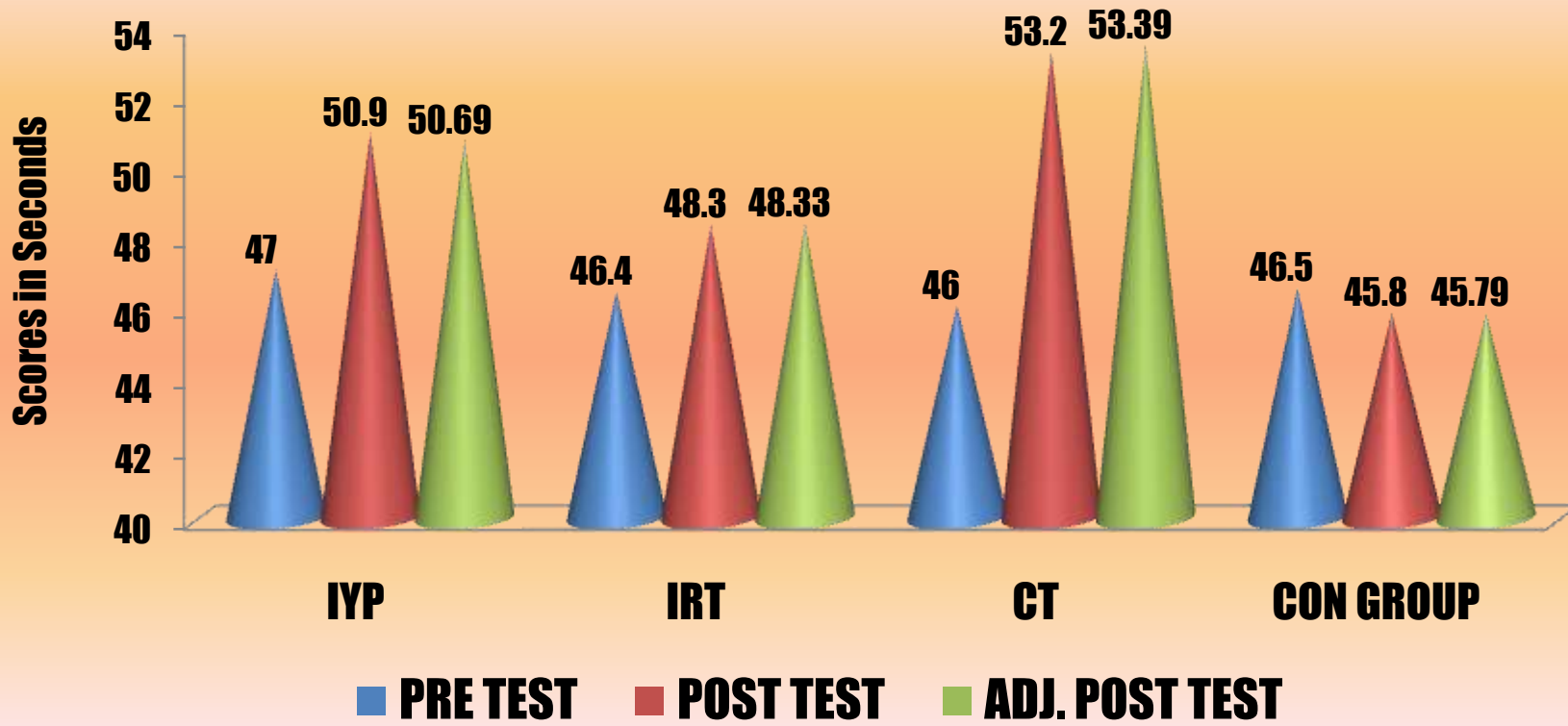


FIGURE 6
BAR DIAGRAM SHOWING THE PRE, POST AND ADJUSTED POST
TEST MEANS OF TENSION
(Scores in Numbers)

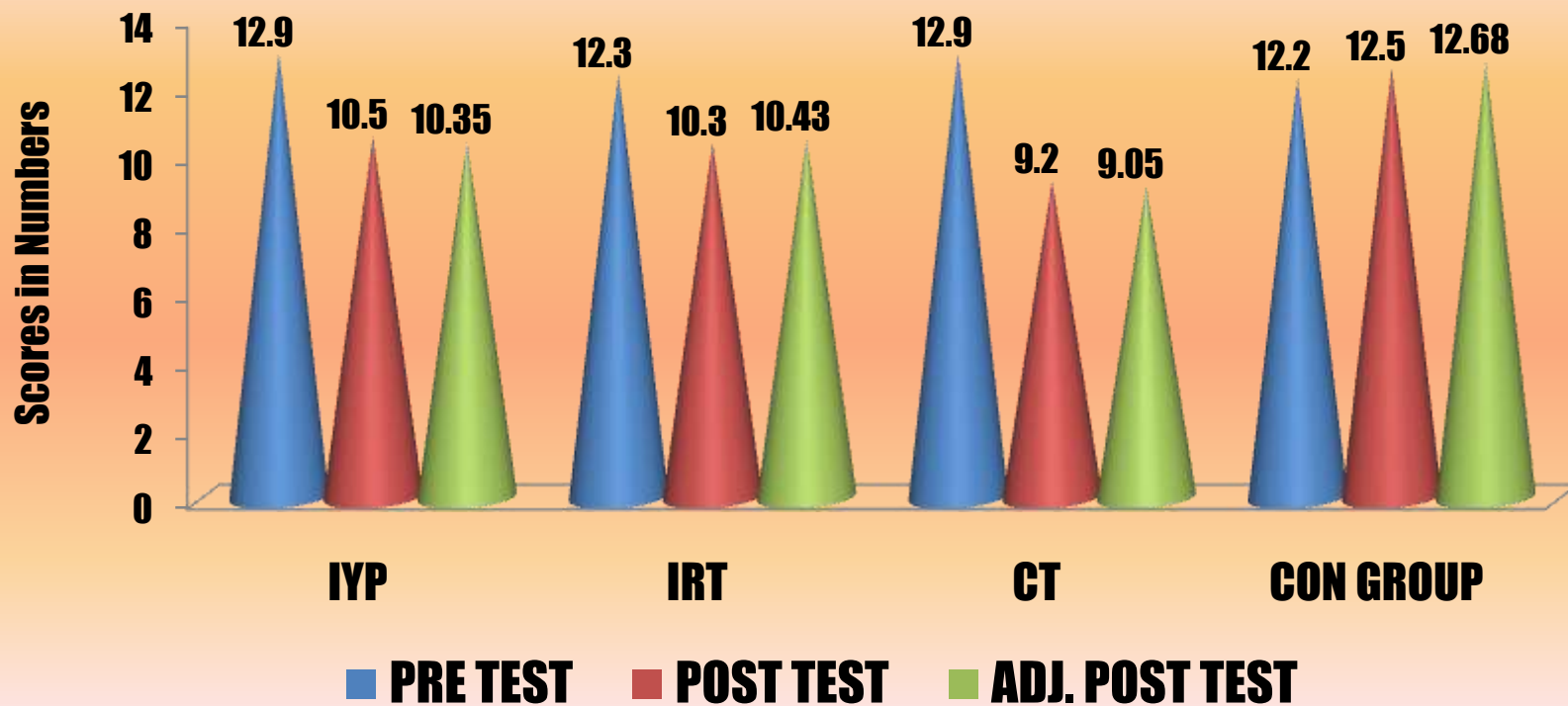


FIGURE 7
BAR DIAGRAM SHOWING THE PRE, POST AND ADJUSTED POST TEST
MEANS OF DEPRESSION

(Scores in Numbers)

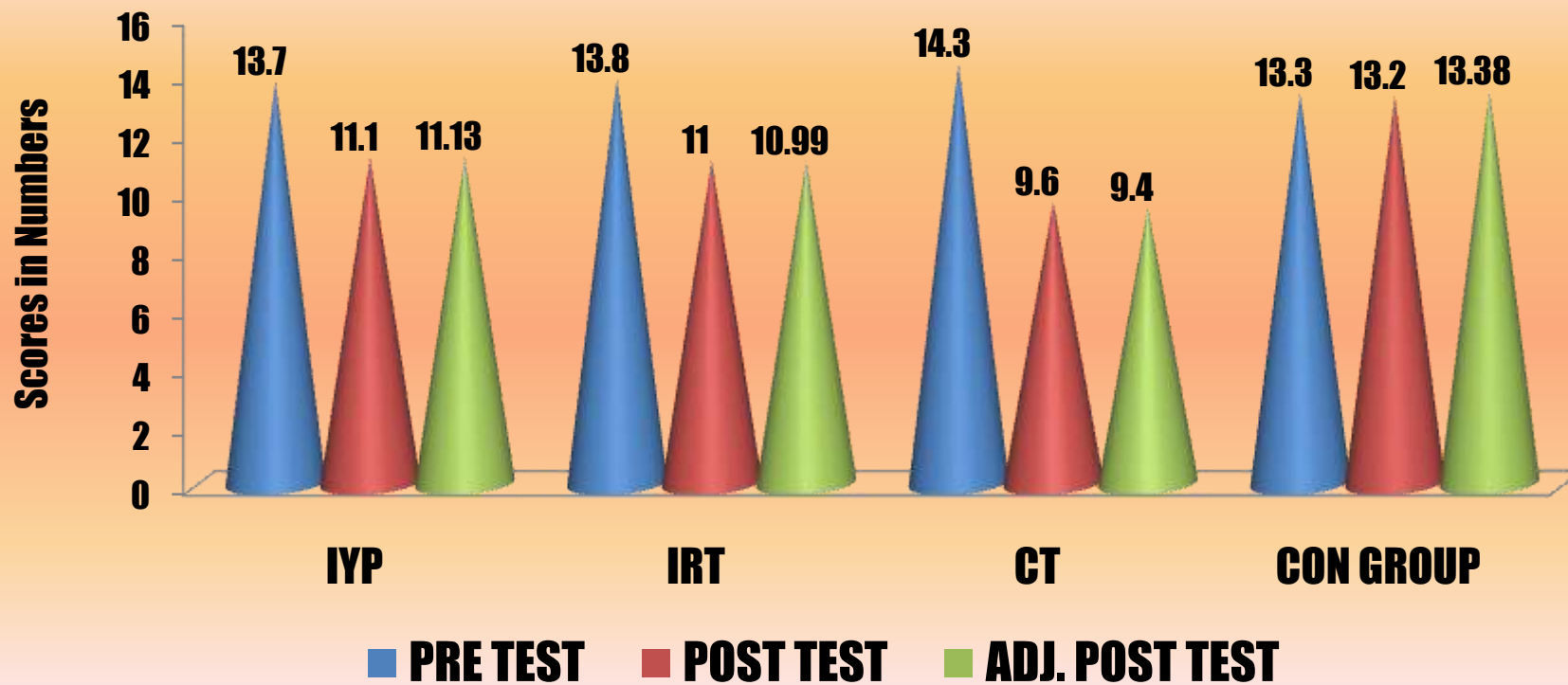


FIGURE 8
BAR DIAGRAM SHOWING THE PRE, POST AND ADJUSTED POST TEST
MEANS OF ANGER
(Scores in Numbers)

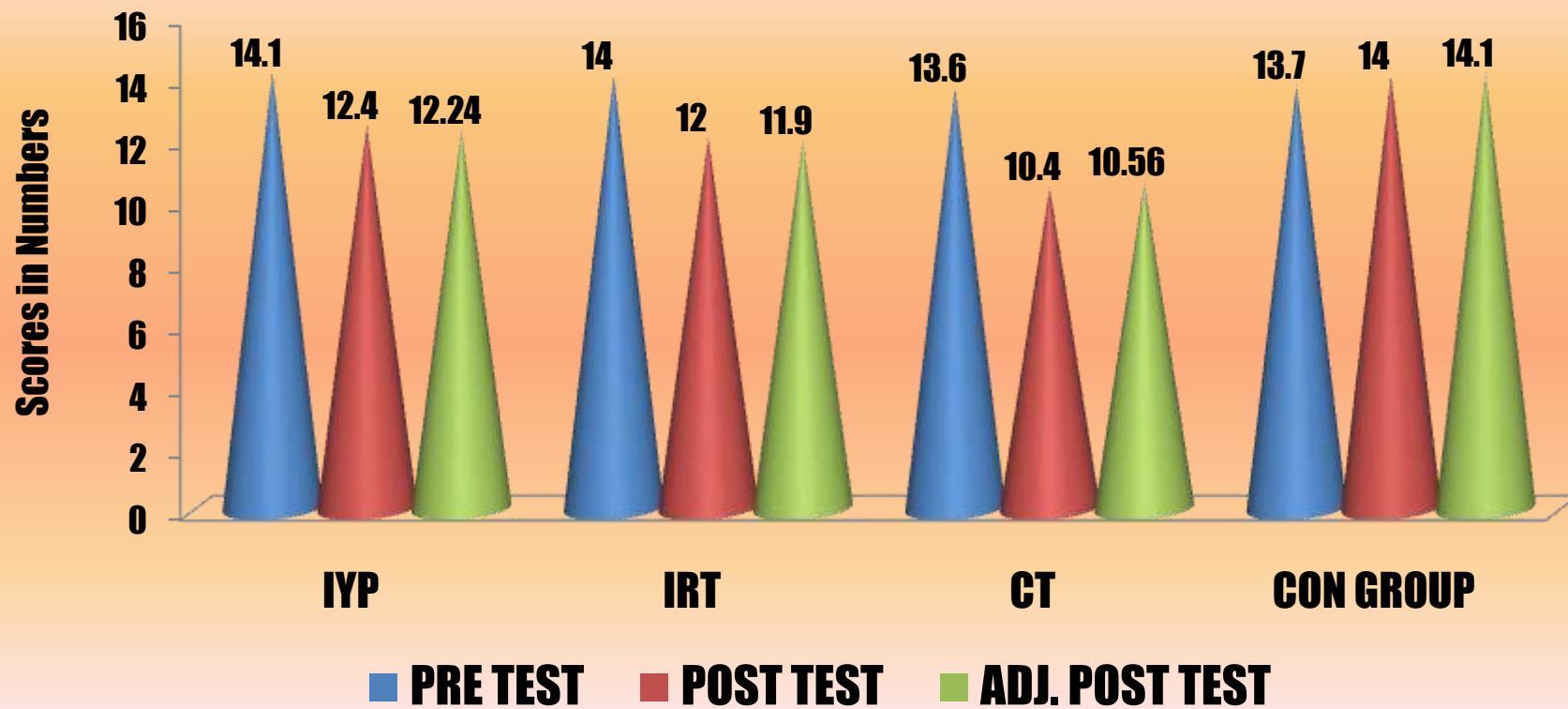


FIGURE 9
BAR DIAGRAM SHOWING THE PRE, POST AND ADJUSTED POST TEST
MEANS OF VIGOUR
(Scores in Numbers)

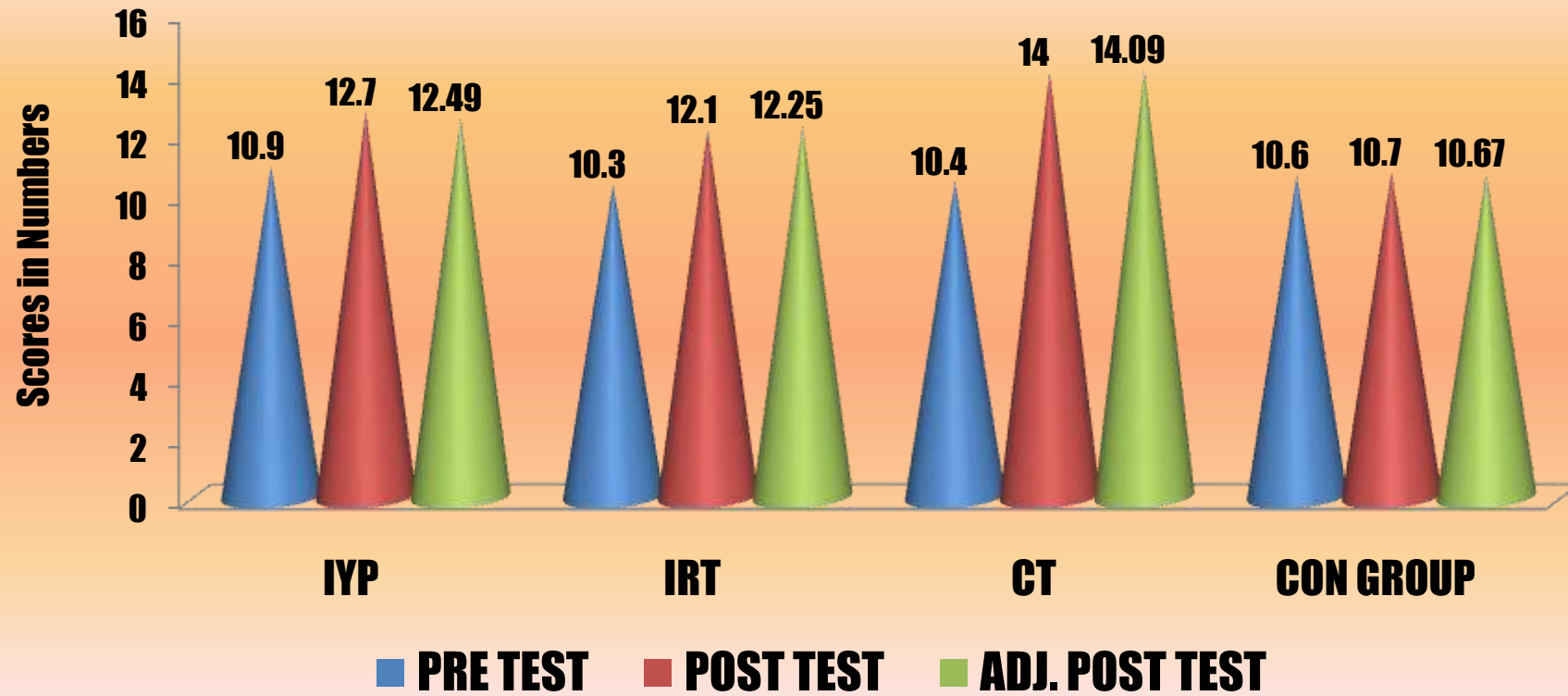


FIGURE 10
BAR DIAGRAM SHOWING THE PRE, POST AND ADJUSTED POST TEST
MEANS OF FATIGUE
(Scores in Numbers)

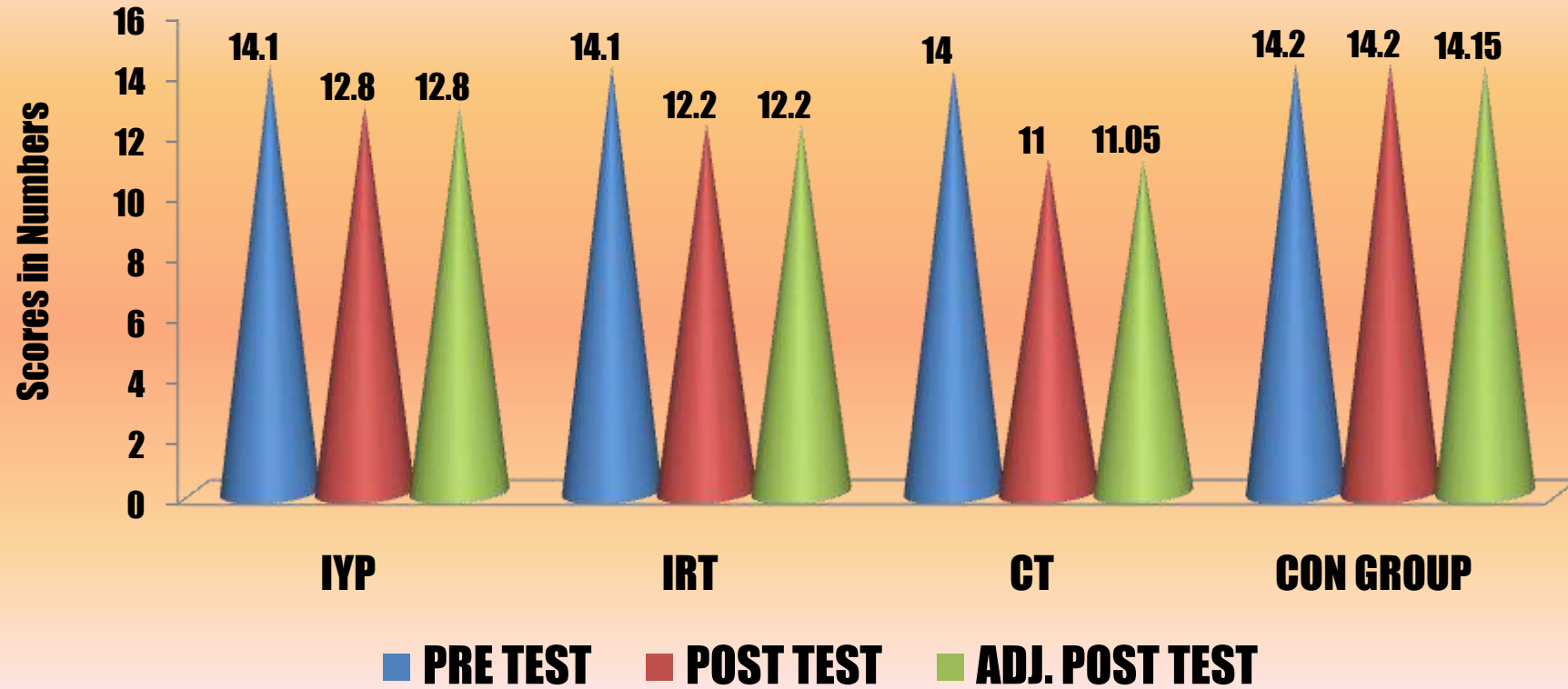


FIGURE 11
BAR DIAGRAM SHOWING THE PRE, POST AND ADJUSTED POST TEST
MEANS OF CONFUSION
(Scores in Numbers)

