

**EFFECTS OF AEROBIC RHYTHMIC EXERCISE AND WEIGHT  
TRAINING ON SELECTED PHYSIOLOGICAL  
HAEMATOLOGICAL AND KINANTHROPOMETRIC  
VARIABLES AMONG COLLEGE MEN OBESE STUDENTS**

**Thesis Submitted to the Tamil Nadu Physical Education and Sports University,  
Chennai for the fulfillment of the requirements  
for the award of Degree of**

**DOCTOR OF PHILOSOPHY  
IN  
PHYSICAL EDUCATION**

**Submitted by  
T. BHARATHI  
(Reg.No. 317)**

**Supervised by  
Dr. N.BRIGHT SELVAKUMAR**



**DEPARTMENT OF PHYSICAL EDUCATION  
TAMIL NADU PHYSICAL EDUCATION  
AND SPORTS UNIVERSITY  
CHENNAI – 600 127  
India**

**APRIL - 2021**

**Dr. N.BRIGHT SELVAKUMAR,**  
**Principal and Research Supervisor,**  
**Christian College of Physical Education, Nagercoil, Tamilnadu.**

---

### **CERTIFICATE BY THE SUPERVISOR**

This is to certify that the Thesis entitle **“EFFECTS OF AEROBIC RHYTHMIC EXERCISE AND WEIGHT TRAINING ON SELECTED PHYSIOLOGICAL HAEMATOLOGICAL AND KINANTHROPOMETRIC VARIABLES AMONG COLLEGE MEN OBESE STUDENTS”** is a record of research work done by **T.BHARATHI (Reg.No. 317)** a Part Time Research Scholar of Doctor of Philosophy in Physical Education, Department of Physical Education, Tamil Nadu Physical Education and Sports University, Chennai - 600 127, during the year **2011 - 2021**.

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

Place: Chennai

**Dr. N.BRIGHT SELVAKUMAR**

Date:

Guide and Supervisor

**T. BHARATHI,**  
Part Time Research Scholar,  
Department of Physical Education,  
Tamil Nadu Physical Education and Sports University,  
Chennai – 600 127.

---

## **DECLARATION BY THE SCHOLAR**

I **T. BHARATHI (Reg.No. 317)** Part Time Research Scholar of Doctor of Philosophy in Physical Education, Department of Physical Education hereby declare that the thesis entitled **“EFFECTS OF AEROBIC RHYTHMIC EXERCISE AND WEIGHT TRAINING ON SELECTED PHYSIOLOGICAL HAEMATOLOGICAL AND KINANTHROPOMETRIC VARIABLES AMONG COLLEGE MEN OBESE STUDENTS”** submitted to Tamil Nadu Physical Education and Sports University, for the award of Doctor of Philosophy in Physical Education, Department of Physical Education is my original work and that it has not previously formed the basis for the award of any degree, diploma, associate ship, fellowship or any other similar titles to any candidate of any university.

Place: Chennai

Date:

**T. BHARATHI**

Research Scholar

# DEDICATED

TO

Beloved Father : Late. P. THARMAIAH (Rtd. Head Master)

Loveable Mother: T.MARY

My Wife: R.DHIVYA M.Sc., B.Ed.

My Children: B.MELWYN DANISH, B. JOVIN DANISH

My Brother & Sister in Law: T.J.T. BHASKAR & B.  
JOSELINE

**TEACHERS, FRIENDS AND FAMILY MEMBERS**

## ACKNOWLEDGMENT

The research scholar expresses his indebtedness and long felt gratitude to his Guide and Supervisor **Dr. BRIGHT SELVAKUMAR**, Professor, Department of Physical Education, Tamil Nadu Physical Education and Sports University for his spontaneous encouragement and inspiring guidance throughout the study. He gave me a moral support and freedom to complete the research study in a successful manner.

The research scholar is grateful to **Dr. SHEILA STEPHEN**, Vice Chancellor, and **Dr. V.GOPINATH**, Registrar, Tamil Nadu Physical Education and Sports University, Chennai for the encouragement towards the completion of this thesis.

The research scholar express his profound thanks to **Dr. S.MANIKANDAN**, Professor and Head, Department of Physical Education, Tamil Nadu Physical Education and Sports University, Chennai for the encouragement towards the completion of this thesis.

The research scholar express his profound thanks to **Dr. S. THIRUMALAI KUMAR**, Professor, Department of Physical Education, Tamil Nadu Physical Education and Sports University, Chennai for the encouragement towards the completion of this thesis.

Heartfelt thanks to **Dr. P.KUMARAVELU & Dr. I. LILLYPUSHPAM** Assistant Professor, Department of Physical Education, Tamil Nadu Physical Education and Sports University, Chennai for the encouragement towards the completion of this thesis.

Heartfelt thanks to, Assistant Professor, **Dr. K.RAJESH KUMAR**, Assistant Professor, **Dr. S.JAYA KUMAR**, Assistant Professor, **Dr. S.VEL KUMAR**, Assistant Professor and **Dr. C.LAKSHMANAN**, Assistant Professor, Department of Physical Education, Tamil Nadu Physical Education and Sports University, for their support to complete the research study.

Heartfelt thanks to **Dr. V.DUR AISAMI** Assistant Professor, Department of Yoga, Tamil Nadu Physical Education and Sports University, Chennai for the encouragement towards the completion of this thesis.

Heartfelt thanks to **Dr.R.RAMAKRISHNAN**, Professor, Controller of Examination (i/c), Tamil Nadu Physical Education and Sports University, Chennai for the encouragement towards the completion of this thesis.

Heartfelt thanks to **Dr. N.ASHOK KUMAR**, Librarian of Tamil Nadu Physical Education and Sports University, Chennai and helped a lot in the documentation to complete the research study.

The scholar expresses his heartfelt thanks to **Dr. S.VAIRAMANI**, Professor and Head, **Dr. R.VASUDEVAN**, Professor and Deputy Head, **Mr. K.SENTHIL KUMAR**, Deputy Dean, Academics, **Mr.D.CHANDRU**, Assistant Professor, **Dr.M.MAHALINGAM**, Assistant Professor, **Dr. P.MUTHUKUMAR**, Assistant Professor, and **Mr.S.TUBIN**, Assistant Professor, Department of Physical Education and Sports, **Dr.M.G.R. Educational and Research Institute**, Chennai, for his encouragement to complete the research study.

The scholar expresses his heartfelt thanks to **Mr.C.DASARADAN**, Gym Instructor, and Students of Dr.M.G.R. Educational and Research Institute, for their consent and whole hearted participation, without them this research would not have been a fruitful one, for their support and encouragement towards the completion of data collection.

The scholar expresses his heartfelt thanks to my wife **Ms. R.DHIVYA** and my children **B.MELWYN DANISH** and **B.JOVIN DANISH** and my brother & sister-in-law **T.J.T. BHASKAR** and **JOSELIN**, for their guidance support though out my life.

The research scholar expresses his sincere thanks to Colleague and Lovable Friend **Mr.D.CHANDRU**, Assistant Professor for having provided his ever loving service and moral support in successful completion of this dissertation.

The Scholar expresses his sincere thanks to all the friends and family who helped directly and indirectly towards the successful completion of this dissertation.

**T. BHARATHI**

## TABLE OF CONTENTS

	TITLE	Page. No
	Title	
	Certificate by the Supervisor	ii
	Declaration by the Scholar	iii
	Dedication	iv
	Acknowledgement	v
	Table of Contents	vi
	List of Tables	vii
	List of Appendices	viii
<b>CHAPTER I</b>	<b>INTRODUCTION</b>	1
1.1	Training	2
1.2	Importance of Sports Training	3
1.3	Aerobic Rhythmic Exercises	4
1.3.1	The Beginning	4
1.3.2	The Heart of It	5
1.3.3	Lot of Pumping In Heart	5
1.4	Oxygen Consumptions And Muscles	5
1.5	Regularity of Aerobic Exercise	6
1.6	Benefits of Aerobic Exercise	8
1.7	Weight Training	9
1.7.1	Weight Training Versus Other Types of Exercise	9
1.7.2	History of Weight Training	10
1.7.3	Basic Principles	11
1.8	Physiological Variables	12
1.8.1	Resting Pulse Rate	12
1.8.2	Blood Pressure	13
1.8.3	Vo2 Max	14
1.9	Hematological Variables	15
1.9.1	Hemoglobin	15
1.9.2	Red Blood Corpuscles	17

1.9.3	Hemoglobin	17
1.9.4	White Blood Cells	18
1.10	Kin Anthropometric Variables	18
1.10.1	Fat Mass	18
1.10.2	Lean Body Mass	18
1.11	Objectives of The Study	19
1.12	Reason For Selection of Topic	20
1.13	Statement of The Problem	20
1.14	Hypothesis	20
1.15	Significance of The Study	21
1.16	Delimitations	22
1.17	Limitations	22
1.18	Meaning And Definition of The Terms	23
1.18.1	Aerobic Rhythmic Exercise	23
1.18.2	Weight Training	23
1.18.3	Resting Pulse Rate	23
1.18.4	Mean Arterial Blood Pressure	24
1.18.5	Vo2 Max	24
1.18.6	Hemoglobin	24
1.18.7	Red Blood Corpuscles	24
1.18.8	White Blood Cells	25
1.18.9	Fat Mass	25
1.18.10	Lean Body Mass	25
<b>CHAPTER – II</b>	<b>REVIEW OF RELATED LITERATURE</b>	26
2.1	Studies on Aerobic Rhythmic Exercise	26
2.2	Studies on Weight Training	33
2.3	Studies on Physiological Variables	47
2.4	Studies on Hematological And Kin Anthropometric Variables	51
2.5	Summary of Review of Related Literature	64
<b>CHAPTER – III</b>	<b>METHODOLOGY</b>	65
3.1	Selection of Subjects	65

3.1.1	Subjects Orientation	65
3.2	Selection of Variables	66
3.2.1	Selection of Dependent Variables	66
3.2.2	Selection of The Independent Variables	67
3.3	Pilot Study	67
3.4	Criterion Measures	67
3.5	Reliability of Data	68
3.5.1	Reliability of The Tests	68
3.5.2	Reliability of Instrument	69
3.5.3	Subjects Reliability	69
3.5.4	Instrument Reliability	69
3.5.5	Testers Reliability	70
3.6	Experimental Design	71
3.6.1	Experimental Group – I ( Aerobic Rhythmic Exercise Training)	72
3.6.2	Experimental Group – II ( Weight Training)	75
3.7	Test Administration	77
3.7.1	Physiological Variables	77
3.7.1.1	Resting Pulse Rate	77
3.7.1.2	Mean Arterial Blood Pressure	78
3.7.1.3	Vo2 Max	79
3.7.2	Hematological Variables	81
3.7.2.1	Hemoglobin	81
3.7.2.2	Red blood cell Test	81
3.7.2.3	White blood cell Test	82
3.7.3	Kin Anthropometric Variables	83
3.7.3.1	Fat Mass	83
3.7.3.2	Lean Body Mass	83
3.8	Statistical Technique	84
<b>CHAPTER- IV</b>	<b>RESULTS AND DISCUSSION</b>	<b>85</b>
4.1	Overview	85
4.2	Test of Significance	85

4.3	Level of Significance	86
4.4	Computation of Analysis of Co Variance And Scheffe's Post Hoc Test	86
4.5	Results on the Resting Pulse Rate	86
4.5.1	Discussion on Findings of Resting Pulse Rate	90
4.6	Results on Mean Arterial Pressure	91
4.6.1	Discussion on Findings of Arterial Pressure	96
4.7	Results on Vo2 Max	97
4.7.1	Discussion on Findings of Vo2max	101
4.8	Results on Hemoglobin Count	101
4.8.1	Discussion on Findings of Hemoglobin Count	106
4.9	Results on Red Blood Cells	107
4.9.1	Discussion on Findings of Red Blood Cells	111
4.10	Results on White Blood Cells	112
4.10.1	Discussion on Findings of White Blood Cells	117
4.11	Results on Fat Mass	118
4.11.1	Discussion on Findings of Fat Mass	123
4.12	Results on Lean Body Mass	123
4.12.1	Discussion on Findings of Lean Body Mass	128
4.13	Discussion on Hypothesis	129
<b>CHAPTER – V</b>	<b>SUMMARY, CONCLUSION AND RECOMMENDATIONS</b>	131
5.1	Summary	131
5.2	Conclusion	132
5.3	Recommendations for Practitioners/ Government	133
5.4	Suggestion for Further Research	134
	<b>BIBLIOGRAPHY</b>	135

## LIST OF TABLES

TABLE NO	TITLE	PAGE NO
1	Intra class correlation co-efficient of test – retest	70
2	Training Programme for Experimental Groups	71
3	Aerobic Rhythmic Exercise Training Programme (floor)	73
4	Aerobic Rhythmic Exercise Training Programme (step)	74
5	Twelve Weeks Weight Training Programme With Target Percent 1 RM	76
6	Computation of mean and Analysis of Covariance of Resting Pulse Rate of Experimental and Control Group	87
7	Scheffe's post-hoc test for resting pulse rate	89
8	Computation of mean and analysis of covariance of mean arterial pressure of experimental and control group	92
9	Scheffe's post-hoc test for mean arterial pressure	94
10	Computation of mean and analysis of covariance of Vo2 max of experimental and control group	97
11	Scheffe's post-hoc test for Vo2 max	99
12	Computation of mean and analysis of covariance of hemoglobin count of experimental and control group	102
13	Scheffe's post-hoc test for hemoglobin count	104
14	Computation of mean and analysis of covariance of red blood cells (RBC) of experimental and control group	107
15	Scheffe's post-hoc test for red blood cells (RBC)	109
16	Computation of mean and analysis of covariance of white blood cells (WBC) of experimental and control group	113
17	Scheffe's post-hoc test for white blood cells (WBC)	115
18	Computation of mean and analysis of covariance of fat mass of experimental and control group	119
19	Scheffe's post-hoc test for fat mass	121
20	Computation of mean and analysis of covariance of lean body mass of experimental and control group	124
21	Scheffe's post-hoc test for lean body mass	126

## LIST OF FIGURES

Sl. No	TITLE	PAGE NO
1	Bar diagram showing pre, post and adjusted post-test values of control group, two experimental groups on Resting Pulse Rate	90
2	Bar diagram showing pre, post and adjusted post-test values of control group, two experimental groups on mean Arterial Pressure	95
3	Bar diagram showing pre, post and adjusted post-test values of control group, two experimental groups on Vo2 max	100
4	Bar diagram showing pre, post and adjusted post-test values of control group, two experimental groups on Hemoglobin count	105
5	Bar diagram showing pre, post and adjusted post-test values of control group, two experimental groups on Red Blood Cells (RBC)	110
6	Bar diagram showing pre, post and adjusted post-test values of control group, two experimental groups on White Blood Cells (WBC)	116
7	Bar diagram showing pre, post and adjusted post-test values of control group, two experimental groups on Fat Mass	122
8	Bar diagram showing pre, post and adjusted post-test values of control group, two experimental groups on Lean Body Mass	127

## LIST OF APPENDICES

APPENDIX	TITLE	PAGE NO
A	Raw scores on Resting Pulse Rate	144
B	Raw scores on mean Arterial Blood Pressure	145
C	Raw scores on Vo2 max	146
D	Raw scores on RBC	147
E	Raw scores on WBC	148
F	Raw scores on Hemoglobin	149
G	Raw scores on Fat Mass	150
H	Raw scores on Lean Body Mass	151
I	Training photos	152

### LIST OF REPRINT

Sl.No	TITLE
1	Effects of aerobic rhythmic exercise and weight training on Vo2 max among college men obese students
2	Effect of aerobic rhythmic exercise and weight training on hemoglobin count among college men obese students