STUDY OF HEMATOLOGICAL AND CARDIO-RESPIRATORY PARAMETERS DURING HOMEOSTENOSIS IN SENIOR CITIZENS OF VADODARA CITY

A Thesis Submitted to

SUMANDEEP VIDYAPEETH

(Declared as Deemed to be University U/S 3 of UGC Act 1956)

For the Award of the Degree of

Doctor of Philosophy (PhD)

By

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UNDER THE GUIDANCE OF

DR. J.M. HARSODA Ph.D. [Medical Physiology]

PROFESSOR AND HEAD OF PHYSIOLOGY DEPARTMENT

MARCH, 2018

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I, **Dr. Upendrakumar Indukumar Bhatt**, hereby declare that **Sumadeep Vidyapeeth** has the right to persevere, use and disseminate my thesis entitled **"STUDY OF HEMATOLOGICAL AND CARDIO-RESPIRATORY PARAMETERS DURING HOMEOSTENOSIS IN SENIOR CITIZENS OF VADODARA CITY"** in print or electronic format for Academic /Research purpose.

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I declare that the thesis titled, **"STUDY OF HEMATOLOGICAL AND CARDIO-RESPIRATORY PARAMETERS DURING HOMEOSTENOSIS IN SENIOR CITIZENS OF VADODARA CITY"** submitted for the degree Doctor of Philosophy (PhD) in the subject Physiology by me is the record of original research work carried out by me during period from January 2014 to March 2018 under the guidance and supervision of guide Dr. J.M. Harsoda. The research work compiled in this thesis of free from any kind of plagiarism.

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यस्य देवे पराभक्तिः, यथा देवे तथा गुरौ

तस्यै हि कथिता : अर्था : प्रकाशन्ते पुरा बुधैः।

He, who has utmost dedication to
The Lord of light

And so is his dedication to his guide,

In him only, click the correct meaning of what the Great Masters have said in past.

ईशानः सर्व विद्यानाम्, ईश्वरः सर्व भूतानाम् ।

ब्रह्माधिपतिः ब्रह्मणोधिपतिः ब्रह्मा शिवो मे अस्तु सदा

शिवोम्।।

INDEX

ABBRIVATION AND THEIR FULL FORMS

NO.	ABBRIVIATION	FULL TERM
1	Wt.	WEIGHT
2	Ht.	HEIGHT
3	BMI	BODY MASS INDEX
4	SFT	SKIN FOLD THICKNESS
5	Hb	HEMOGLOBIN
6	PCV	PACK CELL VOLUME
7	MCHC	MEAN CORPUSCULAR HEMOGLOBIN CONCENTRATION
8	MCH	MEAN CORPUSCULAR HEMOGLOBIN
9	MCV	MEAN CORPUSCULAR VOLUME
10	RDW	RED CELL DISTRIBUTION WIDTH
11	ESR	ERYTHROCYTE SEDIMENTATION RATE
12	HR	HEART RATE
13	SBP	SYSTOLIC BLOOD PRESSURE
14	DBP	DIASTOLIC BLOOD PRESSURE
15	SPO2	SATURATION OF PARTIAL OXYGEN PRESSURE
16	IRV & IRC	INSPIRATORY RESERVE VOLUME & INSPIRATORY RESERVE CAPACITY
17	TV	TIDAL VOLUME
18	VC	VITAL CAPACITY
19	ERV& ERC	EXPIRATORY.RESERVE VOLUME & EXPIRATORY.RESERVE CAPACITY.
20	VO2 MAX	VOLUME OF MAXIMUM OXYGEN CONSUMPTION

21	FVC	FORCED VITAL CAPACITY
22	FVC%PRED	FORCED VITAL CAPACITY PERCENT PREDICTED
23	FVC M. PREDICTED	FORCE VITAL CAPACITY MEAN PREDICTED
24	FEV1	FORCED EXPIRATORY VOLME IN 1^{ST} SECOND.
25	FEF25-75	FORCED EXPIRATORY FLOW BETWEEN.25% & 75 % OF FORCED VITAL CAPICITY
26	PEFR	PEAK EXPIRATORY FLOW RATE
27	FEF0.2-1.2L	FORCED EXPIRATORY FLOW BTN.200mL. &1200 mL. OF FORCEDVITAL CAPACITY
28	MVV	MAXIMUM VOLUNTARY VENTILATION
29	RMV	RESPIRATORY MINUTE VOLUME
30	SVC	SLOW VITAL CAPACITY
31	TLC	TOTAL LUNG CAPACITY
32	DI	DYSPNOEIC INDEX
33	FEV3	FORCED EXPIRATORY VOLUME IN 3^{RD} SECOND
34	VC	VITAL CAPACITY

ACKNOWLEDGEMENT

Although it is generally accepted that the great wonder of the world, Taj Mahal was a creation of a Mughal Emperor, yet no body is ignorant that practically many anonymous individual had helped to make the dream come true.

Likewise, in bringing up my thesis to the existing shape a number of persons contributed in one way or the other. I feel the privilege and humble pride for getting their co-operation and sincerely acknowledge the valuable assistance they provided or the role they played in helping me.

Herewith I take opportunity to express my humble gratitude to a complete scientist and a noble personality, my Guide Dr. J.M. Harsoda, whose day by day hints of guidance at every turning point, will remain as the most valuable gems in treasure of experience of life for me. I thank and salute his profound knowledge and keen interest he displayed in my research work.

I also thank Dr. Jayshree Mehta whom I consider my mentor, who always ignited a spark of enthusiasm and ripples of energy unsparingly.

It is a moment of pleasure and pride to thank the Dean of SBKS and MI&RC Dr. G.V. Shah Sir who always suffused confidence in all meetings by his mellow guidance and recharged me with fresh energy. I express my humble thanks o our beloved V.C. Dr. Bharaney Sir also.

My association as teacher in Physiology Department of SBKSMI&RC gave me opportunity to understand better perspectives of Medical Physiology.

Dr. Chandwani, Dr. Sadhana mme. [my respected guide for M.D.]Dr. Hathi, Dr. Harshida Thakker; Dr.B.M.Palan sir, Dr. Tarun Das sir, all through the years I spent in the privileged presence of these brilliant veterans, they, not only shaped me for appropriate post graduate student ship but also provided me those moments and milleu that I could take the challenging task of research like a young and energetic scholar.

The senior teachers of other departments of our Institute helped me unsparingly and whole heartedly; to name a few of those many, DR. J.D.Lakhani sir, and Mrs. Dr. Sucheta Lakhani mme, Dr. V.P. Singh sir, Dr. Nirav Parghi sir, Dr. Tandon sir, Dr. Pasle sir, Dr.Goswami sir, Dr. Hetal Pandya mme, Dr. Sattigeri mme, Dr. Sagun Desai sir, Dr.Niraj Pandit sir, Dr. Shukla sir of L.R.C., here with, I acknowledge them for the help and motivation they provided me.

Medical fraternity of Physiology Department gave valuable in puts , and provided cheerful ambience all through. The hints and help they extended to me, particularly the contribution by Dr. Puja Dullo mme, Dr. Mahavirsingh Ranavat, Dr. Geetanjali Purohit, Ms. Hiral Panchal and my co- colleagues Dr. RajniBala Jasrotia, and Dr. Arvind Kanchan, [The Ph. D. Scholars] I acknowledge herewith.

I sincerely thank with esteem respect, Dr. Divyang Patel, and Dr. Vaghasia for giving profound help and inputs for statistics and epidemiologic aspects.

I thank the non teaching staff of Physiology Department, especially, Ashwin bhai, Hitesh bhai, Ms. Brijal, Kamlesh bhai, Mulji bhai, and office staff of Medical College and Dean's office.

I thank Dr. Pranesh Shroff and Dr. Parul Shroff both, [M.D.-Bombay] who made many research articles available to me,for which I am greatly indebted.

I thank Dr. Ajay Vyas [M.S. - Lap. Surgeon] and Ms. Parul Vyas for providing valuable help personally on innumerable instances and through their institutions of work.

I also thank Dr. Nirav Patel and Dr. Haresh Desai for giving comfort and lot of help for travels.

I acknowledge the help of Dr. Kalpana Dhomse who with her nurse colleagues helped to take the ECG of female participants. I thank Mr. Dhiman of Clarity instruments for providing ECG papers and ECG gel free of cost.

I acknowledge, and thank all my young and elderly senior citizen friends, their families and their activity centers.

I thank and acknowledge all distinguished research scientists whose literature I used, and whose work carries profound respect in my heart; situationally , I might have failed to acknowledge their literature by due citation, but here I take opportunity to acknowledge their contribution if that be the case.

I thank Nafis bhai and his staff of Lotus Graphics and persons of saffron towers who in time gave the thesis preparation work done.

At end I thank all my family members , particularly my elder brother Dr. U.I. Bhatt[Ph.D.] and younger brother Dr. D.I. Bhatt [Ph. D.] who gave me lot of motivation and energy to accomplish this task .I thank Ram, Tejas, Darshana and Shivani for helping me on computer and boosting my spirit while in work. My other relatives like Dr. M.P. Pathak and family and my neighbourers gave me help to provide assistance from elderly people.

I herewith acknowledge the silent and subtle stimulus and profound attention I got from my wife Nila, and at end conclude by humbly thanking my spiritual guide who is an icon of eternal light for the whole universe providing help and strength selflessly and anonymously and unsparingly.

INTRODUCTION

One of the stalwarts of Gerontology and Geriatrics of our times, Dr. Edward G. Lakatta [1], in his McDonald lecture "Artery 12," delivered at Vienna, Austria, on October 20, 2012 stated that-"Any discussion about any aspect of aging cannot beg the issue of what aging is. It is a tough question, and there are numerous perspectives regarding the answer. My view is that "aging is a shift in organism's reality.", and adding to that he states that- "reality can be defined as a system of mutual enslavement of DNA and its environment."

Boron [2] has mentioned that generally agreed on panel of biomarkers has yet to emerge, so currently it is impossible to quantitate aging. As a rule, aging of human beings is a universal phenomenon.

Entities of animal kingdom, plant kingdom or even inanimate articles have aging and associated diminished strength [like civil engineering monuments or building structures.]

From time immemorial, the sages, seers or scientists; of occidental or oriental world, with open mind inquest, have been intrigued and impressed by the epochs of aging- a down-hill course in biology of man.

To enhance health, retard physical disorders, persue life of long expectancy, minimizing limitation and add a positive sense of bliss were perhaps the probable goals of these researchers across millennia in past and the same still persist as an unending aspiration.

N. H. Keswani [3] has mentioned that, Jean Fernel (1497-1588) first time quoted the term “Physiologia” in first part of his book “De Naturally Parte Medicinae Libri Septum” in 1544.

Western historians state that Alcmeon of Crotona (500 B.C.) was the first who presented views about functions of Soma - (Body).

Keswani has also mentioned various historical periods and their chronology, in connection to Vedic and Post Vedic Periods.

At home or abroad, during this long spectrum of history, man has expressed curiosity and inquest for aging changes and solutions to disorders related to it.

In the treatise on “Rasa Vidya” Shrimat Govind Bhagvatpada[4] in his book “Ras Hridaya Tantra”[? 7^{th} Century] has mentioned about longevity and medical compounds useful for it; but this book in its unabridged form and explicit details for the various synonyms for medical plants used; is not available.

In early pages of this treatise; Sir P.C.Roy while commenting on the text and giving history of Chemistry mentioned that “even in Rigvedic time, some substance called “SOMA RASA” [equivalent to Greek “Ambrosia”, [he mentions,] which was claimed to give immortality, was there.

It is noteworthy that Adi Shanker [5][whose time is disputable,] gave a very vivid account of aging person- having sarco penia, frailty, edentulous wrinkled face, grey hair, who walks with help of a stick [“IADL” - Instrument Assisted Daily Living ?] and the reverend author has also declared that “indeed, time eats away the world!”

The history of Gautama Buddha, [whose denouncement was consequent to seeing an aged person with curiosity]; the centenarian life of “Father of Modern Medicine” Hippocrates, while in his time, life expectancy was only around 30 years. - are a few of shining examples of quest and successful management of aging in past centuries.

In the contemporary literature on Yoga, a number of yogis like Maha Avatar Baba [6] Trailang Swami [7] Yogis of Gyan Ganj [8] and Devraha Baba who was visited by Pt. Nehru and the then President Dr. Rajendra Prasad; is speculated to have life span of rather more than 200 years!

S.K.Manchanda et al. [9], in his article “Yoga and Scientist” state that- “recently many scientists of unquestionable integrity have published reports to authenticate existence of these psychic phenomena. Many laboratories in the U.S.A. Europe and the U.S.S.R. are vigorously perusing research in this field…if a practitioner can successfully channel this serpent power [*Kundalini Shakti*] through the successive steps, of the various nerve centers [*Chakras*], he is able not only to control his autonomic activities and sensory inputs but also acquire skills and powers of mind which are supernormal or paranormal.” The reason for bringing the point of such incredible longevity in foreplay, is that, these exceptional looking examples may be of those individuals who could gain the healthful existence in aging period by perhaps defying the usual and inevitable phenomenon of Homeostenosis which ends fatally during the downhill course of life due to its progressive increase in aging of common man. It is possible that some clue lies in their way of life which displays retarded state of Homeostenosis. This may be treated further in chapter of discussion.

Such vertical achievement can so occur as an exception to a law but may not be a generality for most human beings and for them, hence aging is an unpreventable, progressive downhill course of many biologically important phenomena which leads to gradual yet progressive state of loss of functional reserves- called "HOMEOSTENOSIS".

With added medical progress and care, the decrease in child death and increase in life expectancy has raised the number or percentage of aging population. Therefore, the study and management of issue of homeostenosis is the need of this large population, and need of the time.

The line of difference between "physiological aging" and "pathological homeostenosis" is often vaguely distinguishable and hence the aging of each person may be outcome of individual phenomenon affected by various intrinsic and extrinsic mechanisms and the response may be variable to some degree and manner.

Indians had average life expectancy of 26 years at time of year of Independence [1947], to presently [in year 2015] of 64 years, also it is stated by Harsh Mohan [10] that, survival is longer [3:2] in females as compared to males. Listing organ changes in aging the same author has mentioned about cardiovascular decline in morphology and function. It is also noteworthy that, G.K. Bhattacharya [11] has given definition, contributing factors, indicator of declining cell function associated with cell aging, alterations in cells aging, and given theories of cell aging in brief.

Best And Taylor[12] have mentioned that, "with advancing age , significant reduction occurs in functional capacities of many different organ systems…often times these changes are secondary to alterations in circulation, which results in impairment of blood flow to specific organ or tissue, which are independent of arteriosclerosis, and

their prevalence increases in elderly. This functional reduction plays important role in cumulative functional impairment."

United Nations [13] (1998) considers 60 years as age of transition to elderly age group.

Oeppen and Vaupel [14] are of opinion that due to improvement in hygiene and health care, human life expectancy has been increased at the rate of about 2.5 years per decade since the middle of nineteenth century.

According to UN [15] population of aged is 9 % (6.7% in less developed countries and 15 % in developed countries). It has been projected [16] that, by year 2050, the number of elderly people would rise to about 324 millions! The authors have given various statistical values of aging in developed country like U.S.

AH Suryakantha [17] states that, population percentage of elderly is more in developed countries, but the majority of old people live in developing countries.

As such the issue of aging must get the deserving priority in developing countries like India, and there is dire need to focus on the aging population, their aging realities, particularly more on diminishing functional reserves called "Homeostenosis," in trilogy of Hematological tissues, Respiratory system and Cardio-vascular system.; because, Cyril et al.[18] have stated that, after retirement at 65, elderly people become more liable to infection of respiratory tract, cardio-vascular disorders and malignant diseases. As such the degree of homeostenosis is directly or indirectly responsible for morbidity and mortality in this huge population .The gravity of Indian scenario may be clear by this statement of Kumar V [19]that," from

morbidity point of view, almost 50% of Indian elderly have chronic diseases and 5 % have immobility !"

The senior citizens are age specific elderly of both sexes who may be prone to individual negative physical, socio-psycho logic, and environment related risk factors during their aging, capable of causing reduction in the reserves of their vital organ functions leading to "Homeostenosis."

Hence the candidate was interested in study of homeostenosis in the three closely related system complexes which are inter related as well as interdependent too, in population of elderly (senior citizens) of Vadodara city.

Vadodara is a rapidly developing and urbanizing city in central Gujarat, with fast rate of growth and progress. It is one of first 10 cities proposed as smart cities by Govt. of India, and has also been designated as one of the cleanest cities of India.

In Vadodara, the population of senior citizens is relatively more as it is conventionally deemed suitable for retired persons. The culture, peaceful ambience, gardens, items and avenues of relaxation and recreation, numerous active organizations related to elderly people and above all reasonably priced excellent quality health care facilities, might be perhaps the reason for relatively denser agglomeration of this population in Vadodara city.

The candidate came to know from personal communication with one expert, that, even the reference values related to Indians for many parameters are yet not available and we have to use the standardized international reference values in many instances. CW Tsang et al. [20] have stated that unavailability of established reference values may create serious issues. They by quoting Soldberg HE, [21] say that the

reference values for elderly may differ from those of younger persons; Tsang et al. have also made clear that inappropriate reference values may increase the risk of either unnecessary additional investigation or, failure to detect underlying disorder. Faulkner WR, [22] states that, deriving reference values is problematic in elderly, because age related physiologic changes are also known to occur.

The study of presence and magnitude of homeostenosis is so far not done elaborately in this elderly group of population of Vadodara city

Common Eugeric Changes Occurring In "Physiologic Aging":

By the term "Eugeric" we mean occurring in normal or physiologic or uncomplicated aging. [Here, additional co-morbid other pathological condition is absent to begin with.]

These changes are vividly described in medical literature often at length by excellent studies done at American Heart Association, Baltimore Longitudinal Study Of Aging, Framingham Heart Study, National Heart, Lung And Blood Institute-USA, and also in many institutions elsewhere in U.S.and also in European countries and Australia.

Prominent Age Related Changes :

- Decreased bone marrow cellularity, with decrease in red bone marrow.
- Diminished total body weight with more reduction in fluids [total body water]
- Progressive disappearance of estrogen activity by their increased urinary excretion.[menopause-52 years]

- The Decrease in renal function at the rate of 10 % decrease in no. of glomeruli and nephron function.

- Due to sarcopenia decrease in muscle mass, which is regarded as secondary to diminished muscular action, or loss of neurons related to muscle power or strength and eventually leading to diminished B.M.R.; also decrease in protein absorption.

- Presbyopia [40-45 years onwards] and a number of occular disturbances are noted. And Presbyacusis [in about 33 % by 75 years]; may be primarily due to degenerative changes in olfactory apparatus. which lead to progressive rise in olfactory threshold and impaired olfaction. tactile sensitivity may become less.

- Senile dementia; decrease in REM sleep time, and stage IV sleep time; slow voluntary movements; tremors, electro encephalogram changes as the processing of afferent signals is redundant, the reaction time and hypokinesia may result.

- Decrease in Cardiac Index; Cardiac Out Put, changes in Systolic Blood Pressure and Diastolic Blood Pressure values; Heart Rate, Pulse Wave Velocity related issues, and Electro Cardiogram features may be abnormal. Changes in vascular aspects, which influence the cardiovascular function.

- Pulmonary functions gradually and progressively deteriorate; may lead to COPD [Chronic Obstructive Pulmonary Disorder/disease] or restrictive pulmonary disease. Numerous changes occur in chest wall like- stiffness, kypho- scoliosis and alterations in lung's structural components, quantitative /qualitative/or dimensional changes in broncho-alveolar apparatus are presented convincingly.

Changes associated with epithelia, glandular tissues, muscles, cartilages, secretions, molecular mechanisms, capacity and volume of respiration, exchange of respiratory gases, mode of diffusion of respiratory gases, pulmonary vasculature have been mentioned.

Diminished local and general immunity and also non respiratory functions of lung are affected in aging.

- In fact, this is a suggestive list only. And few changes relevant to our population of Vadodara's Senior Citizens shall be presented in this work in later pages.

Boron[23] states- a generally agreed panel on bio markers of aging has yet to emerge; so currently it is impossible to quantify aging of an individual.

Boron also mentions that, Gompertzian and related analysis has been viewed as "Gold Standard" for population aging which are outcome of report of Gompertz-a British actuary, on age specific death rate.

Now, most evolutionary biologists do not accept that aging is an evolutionary adaptation with genetic program.

It would be worthwhile to briefly present selected theories of aging. Which give insight into what causes may play crucial role in critical changes.

Commonly Presented Theories Of Human Aging:[Boron & Boulpaep}

- Gompertzian theory [Gold Standard Theory as stated above]
- Programmed aging theory. [Weissman-1899].
- Resting metabolic theory,[Rubner-1908]
- Rate of life theory,[Pearl-1928]
- Rate of life theory,[Sohal-1986]
- Theory of mutation accumulation,[Medawar-1952]
- Oxidative damage theory,[Emanual-1952]
- Theory of antagonistic pleotrophy,[Williams-1957]
- Telomere theory, [Hay Flick and Moorehead,[1961]
- Telomere theory, [Calvin Harley-1980]
- Oxidative damage theory,[Herman-1998]
- Disposable soma theory,[Kirkwood-1998]
- Redusome aging theory.
- Khalyavkin's theory of aging

Theories for Slow Aging:

- Hermesis theory
- Klotho gene ,[suppressing IGF-1 & Insulin Signaling]theory

Aging Population and Life of a Senior Citizen-

[Epidemiologic Profiles]:

India is studied epidemiologically for aging population and according to existing statistics of present year [2017] it is labeled as a country with aging population by United Nations. The report of Registrar General of Census Operations, Govt. Of India [24] also supports this observation.

United Nation [25] considers 60 years as age of transition to elderly age group. Also, the population of aged persons is 9. 0 %. [6.7 % in less developed countries and 15.0 % in developed countries. UN has declared that when 7% or more than that of total population are elderly (more than 60 years) that country's population is labeled as aging population. India has 7.8 % of total population who are aged 60 years or more.

According to Bhasker Rao Thirunavalli and Usha Rani Chandalawada [26] population of India census which started by 1-3-2011; figures is 1.21 billion; of which, 31.6 % live in urban and 68.84 live in rural area.

The life expectancy of Indians is 64.2 years; whereas, the life expectancy of Indian urban males is 67.1 % and life expectancy of urban Indian female is 70 years. Life expectancy as they mention; is highest in state of Kerala.

ASDR [Age Specific Death Rate] Is Highest In Old Persons; And,

DALY [Death Adjusted Living Years] in India by communicable disease is 50.5 years and by non communicable disease are40.4 years.

Gopal Ingle and Anita Nath [27] mention that by year 2050 the number of elderly people would rise to 324 millions.

AH Suryakantha [28] states that though the population percentage is more in developed countries, the majority of old people live in developing country.

According to Oeppen and Vaupel JA W [29] due to improvement in hygiene and health care, human life expectancy has increased at steady rate of about 2.5 years per decade since the middle of Nineteenth Century.

According to Government of India Statistics, respiratory disorder mortality in elderly is 10 % and cardio - vascular disorder mortality in elderly is $1/3^{rd}$ of elderly mortality.

The Vulnerable Group or Disadvantaged Group is elderly females. [Kumar]

Shah Ebrahim and Julie E. Byles [30] state by quoting WHO, in Oxford Text Book of Public Health that;

Cerebrovascular accidents are having morbidity-[4689] (death- 1000)

Other four main causes of morbidity according to these authors are-

Ischemic Heart Disease-[5825] (death-1000)

COPD [2399] (death-1000)

Lower Respiratory Infections [1396] (death-1000)

Respiratory System Cancer [928] (death- 1000)

The book also mentions that iatrogenic disease is common in older people.

There is greater rate of aging in lower and middle income group; there is compression of morbidity and disability in aging population.

The authors have also presented the strategic methods in early, adult and old age population to increase capacity for health .This point carries significance when we think for homeostenotic issues which in older age group diminish functional reserve.

From all above observations of epidemiology it appears that aging population in India is a large population. Their number and their issues are also more and complex. They have meager resources and are critical individuals who are more vulnerable to aging issues related to heart, lung and blood. Also, these three organ systems-Heart, Lung, and Blood- are inter related as well as inter dependant and hence they are frequently studied as one problem area; secondly these being vital organs, any one of them can induce profound influence in Patho - Physiology of other organs.

In West; as such, there is National Heart, Lung and Blood Institute working for such and similar projects and purpose.

Structured Instruments To Assess Physical Debility:

This type of studies give importance to ***Quality Of Life*** and assessment and adjunct to ***study damages due to debility,*** **or** ***frailty*****.**

- ***Mental state:*** Hamilton Depression Rating Scale **[HAMD]** has 17 structured items in this scale; useful for study of change of mood, depression etc. over period of time. The questionnaire is designed for the adults and is used to rate the severity of their depression by probing their mood, feelings of guilt, suicide ideation, insomnia, agitation or retardation, anxiety, weight loss, and somatic symptoms
- ***Mini Mental State Examination*** **[MMSE]**

  Useful for mild cognition and dementia like mental issues.

- ***Physical Activity Scale For Elderly*****[PASE]**

  10 items for physical activity→ related to walking-house work- sports-for 1 week period assessment by questionnaire. The PASE is a brief and easily scored survey designed to access physical activity in persons aged 65 years and above.

- ***Quality Of Life Assessment*** [**QOLPSV-]**

  54 items related to quality of life; it focuses more on Quality other than absence of disease.

- ***Geriatric Anxiety Inventory:*** **[GAI]**

  Has 20 items to detect +/- [anxiety state]

- ***Mobility Questionnaire*****:** self reported; walk of ¼ mile and / or climbing staircase.
- ***Short Physical Battery:***

  Walking 4 meter-rise from chair 5 times-

Balance for 10 seconds.

Walking Speed Test: walk for 4 minutes speedily.6 minutes walking test-endurance test for speed and physical exercise.

400 meters of corridor walk.

ADL AND IADL [Activities of Daily Living and Instrument Assisted Daily Living].

- ***Fraility Score :***

Body Composition-

Homeostasis Dysregulation-

Energetic Failure-

Neuro -Degeneration

This score is useful because frailty may lead to-

a) Ineffective Homeostatic Response to Stressors, /

b) To, Multiple Co morbidities, /

c) Physical Disabilities, /

d) Geriatric Syndromes.

[*DL Longo, AS Fauci, DL Kasper, SL Hauser, JL Jameson, J Localzo (Ed.): Harrison's Principles of Internal Medicine, 18/e, part-5, pp-562-585.2012.]

As this study pertains to examine the status of diminished functional reserves in senior citizens of Vadodara city, such subjective or qualitative assessments are not included.

About Vadodara City

Vadodara is a rapidly industrializing and urbanizing and one of the first ten smart cities as proposed by government of India which is the designate cleanest city of India having population of about 22 lakh individuals and about 2 Lakh of floating population residing at out skirt areas close to Vadodara borders[31], located in Central Gujarat. It is educational and industrial hub with majority of middle class serving persons.

City being capital of an old royal state of Shri Sayajirao Gaekwad who is regarded as a king of vision, it is well designed beautiful city with moderate climate, plethora of greenery, cultured and sober gentry, and ample of amenities with reasonable scope for tranquil retired life, due to numerous Governmental, Semi Governmental, N.G.O. Voluntary organization or private bodies with dynamic activities and programs for senior citizens, taking care and fulfilling aspirations of retired persons. There are modern Medical Institutions and Center of excelling medical care providing services at moderate charges. Some of them are often free for senior citizens of Vadodara city. As such, it is one of the preferred cities by senior citizens for their retired life. According to estimation by candidate, there may be population of about 2.5 Lakh senior citizens in Vadodara city.

It is also to be noted the year marking for elderly senior begins by 60 years but all persons at 60 years do not lead retired life of retreat, rather many remain functionally active till the situation of health may permit and for one or other reasons.

.The existence and extent of homeostenosis in current senior citizen population not being elaborately studied, by utilizing modern equipments and gadgets of sufficient reliability, specificity and sensitivity, such study is the need of the time, because there is paucity of such assessment and study.

Also, this may aid in establishing base line study for starting future major studies for equivalent parameters or composite programs of more complex study related to senior citizens of Vadodara or elsewhere. It is well known that in every city there are areas, where the socio-economic distribution is unequal. So is also the case in Vadodara, where, there may be regions locally well suited to individuals by their socio economic background.

The increased longevity is not uniform across socio –economic groups or different countries according to authors [32] of Oxford Text Book of Public Health, and hence the existence and extent of homeostenosis may vary regionally. The sample selection may also be a challenge. As such, one study may not correlate with another one.

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AIMS AND OBJECTIVES

TO STUDY THE STATE OF DIMINISHED FUNCTIONAL RESERVES (Homeostenosis) by Approved panel of objectively assessable parameters:

1. In Hematologic,
2. In Cardiovascular and
3. In Respiratory Systems

In senior citizens of Vadodara city.

REVIEW OF LITERATURE

Best & Taylor's statement defines homeostenosis: [1] "With the advancing age significant reduction in functional capacity occur in many different organ system."

Mammalian gerontologists have defined aging in terms of gradual, insidious and progressive declines in structure and function (involving molecules, cells, tissues, organs and organism) that begin to un fold after the achievement of sexual maturity. [2]

The incidence, percentage values, the life expectancy, at birth and at 60 years have been mentioned for India and Inter nationally documented [3]

Western authorities [4] believe that, indeed there is scope for a great deal more work defining the hematological changes consequent of aging.

A number of Patho-Physiologic states have been stated having correlation to aging have been documented. [5-10]

Wintrobe [11] is of opinion that, although this field is neglected, from what is known, it seems unlikely that aging has effects on hematologic parameters, still however, fall in hemopoietic progenitors with age, chromosomal shortening, statistical fall in mean hemoglobin, during sixth through eighth decade, decrease in adaptive immunity, and significantly rising ESR, are mentioned.

Warell et al. [12] have stated that, several studies indicate pro coagulant and fibrino lytic activity changes and levels and diminishing coagulant factors. They have

noted, aged living in isolation have iron deficiency anemia and folate deficiency. Platelet count, serum erythropoietin and white cell count are not changed.

Wintrobe (Ed. John P. Greer et al.) has quoted study of Larson et al. (2006),[13] Appelbaum et al.(2006),[14] Thieblemont and Coffier(2007),[15], NHANES III study ,(1988-1994)[16] and have mentioned decreasing survival chances in ALL, with increasing age, worse out come with AML in aged, increase in number of non Hodgkin Lymphoma with aging and increasing prevalence of anemia[WHO]defined , after 50 years of age respectively.

Bonow R.O. et al.[17] mention [In Braunwald's 'Heart Disease' -2012] that, Cardiovascular disease is both most frequent diagnosis and the leading cause of death in both, man and women older than 65 years.

Lakatta E.G. et al. [18, 19, 20, and 21] have excellently elaborated hall marks of Cardio- vascular aging and relevant parameters, discussed in detail the cellular and molecular clues to heart and arterial aging. They have also correlated the aging at macroscopic and molecular levels. O'Rourke M and Hashimoto J. [22] have studied clinical perspectives of mechanical factors in arterial aging.

In Braunwald's 'Heart Disease' , R.O.Bonow et al.(2012)[23] have summarized cardiovascular changes in aging , like, increase of intimal thickening, arterial stiffening, rise in pulse pressure, increase in pulse wave velocity, early central wave reflection, decrease endothelium mediated vaso-dilation, increase in L A size, appearance of premature complexes, decrease in maximal heart rate, diminished heart rate variability, prolonged conduction time, valvular sclerosis and calcification, rise in L V wall tension, prolonged myocardial contraction, longer end diastolic filling rate, decreased max. Cardiac output, RBB block, and appearance of ventricular premature

complexes, and have mentioned that any one or a set of combination can occur in aging.

Molecular mechanisms of aging and its evolution [26, 27, 28,] by ROI Free radicals, genetic faults and fracture s, telomerase participation, IGF-1, m-TOR, and Histone deacetylase [Sirtuin] mediated cumulative burden of stress induced challenges, and progressively diminishing reparative genetic machinery, diminished inotropic response to aged myocardium, defects in Catechol mediated delivery of Calcium ions, have been described by authorities and their associates [24, 25, 26] in laudable depth.

Radio nuclide Scintigraphy, [27] and Echocardiography [28] have added clarity to aforesaid assessments and these investigative tools are used in documented evidences in cardiovascular responses in aging.

Alfred P. Fishman et al. [29] have demonstrated changes in shape of lung, larger air ways, lung parenchyma, calcification/hypertrophy of mucus glands, flattening of alveoli, diminished elastic recoil/ left side shifting of P-V Curve, variation of PIMax and PEMax changes, [30,31] significant decrease in static compliance of chest wall and increase in FRC[32], diminished ventilatory response to hypoxia, [33], Non – linear PEP decrease[34], decrease in FEV1 and FVC,[35] , increase in VD/VT ratio[36], decline in DLCO, [37] , and ventilation to perfusion V/Q mismatch[38] is well documented .

A] Hutchison –Gilford syndrome and B] Werner's syndrome is the genetically determined Progeriasis syndromes.

In A] there is Lamin –A defect, in B]- WS ATP Dependant Helicase defect.

MATERIAL AND METHODS

3.1: ***Research Approach; Research Plan and Research Design:***

This was programmed in advance, by meeting senior experts in the department.

The term "HOMEOSTENOSIS" was provided by one senior teacher who also provided motivation for study of elderly subjects.

By discussion with guide, it was resolved that such study of senior citizens of Vadodara city was not available, and hence such study can be meaningful as well as important for community.

From these suggestions, the research problem and related research hypothesis was developed that, there is increase in elderly population with increase in life expectancy, yet, in aging population, regrettably such study of heart, lung and blood parameters is on progressively diminishing functional reserve is scanty

Such study of homeostenosis in senior citizens of Vadodara by scientifically approved, valid parameters by equipments and gadgets which can give the results objectively [nullifying chances of personal / manual errors,] which are acceptable because of high specificity and sensitivity; is the need of the time.

Such study will critically address the need to evaluate the patho-physiologic realities of the aging in urban age specific population of Vadodara city.

Also, the outcome will assist in answering the need for the baseline study which can lay the foundation for further establishment of reference values of critical

parameters which are presently not existing or studied sparingly for elderly population of Vadodara city.

3.2: ***Research Design:***

This was a partly qualitative [interrogative/history taking type,] and mainly quantitative assessment to determine state of homeostenosis in elderly of Vadodara city which was conducted in single session in two portions.

3.3: ***Sample Size of Population:***

IN The RAC [Research Advisory Committee] presentation, the guest expert gave a written suggestion that sample size should be determined by consultation of a statistician and as such the size is in accordance to it. As such formula, for the population size, given in literature is not used:

$n= (z^2 x [p x q/ \{d\}^2])$ [for large sample size]

It was also suggested by him to determine of CBC [Complete Blood Cell] count by automatic cell counter, and so here, the variables presented are as per the given suggestions.

A senior Professor of Physiology, Dr. G. K.Hathi who was constituent member of the RAC at the presentation of the pre Ph.D. Synopsis of this candidate, suggested that; control group of young normal adult individuals in age range of 17-20 years in ratio of 1:<4 [control: case] may suffice as the values in this age group will be suitable without influence of aging changes. The Case: Control sample size is taken accordingly.

3.4: *Research Plan:*

1] The sample size: 50 consecutively coming, community dwelling apparently healthy males and 50 community dwelling apparently healthy females in age group between 60-80 years residing in Vadodara for more than 5 years were studied. 15 young adults between age of 17 and 20 years living in similar region or environment, compared; in population ratio of [<4:1]

3.5: *Biological profile of Population [sample] of study:*

Community dwelling mainly middle class, of origin from Gujarat, largely Hindu, vegetarian, non smoking, non liquor consuming settled in Gujarat; for at least for 5 years staying in Vadodara city. Engaged in sedentary life activity, capable of taking self care, as unassisted daily living, adequate awareness and cognition, apparently healthy, with uncomplicated aging.

3.6: *Selection Bias:*

To avoid selection bias the critical population was selected in form of small groups of age specific clusters from different regions of residential areas like Chhani Jakat Naka to Kareli Baug area, Khande Rao Market area, Manjal Pur area etc.

3.7: *Observational Bias:*

To rectify the observational bias, only those gadgets and equipments which can give the result in objectively observable digital technology were used.

3.7: *Compliance and Co-/Assistant investigator*:

The assessment being single time study there were practically no issues of compliance; moreover, for clinical assistance and for ECG in females, one lady health care professional who is GNM reg. nurse, graduate Naturopathy qualified doctor, experienced in London for taking ECG had assisted.

2] FOLLOWING DOMAINS WERE STUDIED:

1) Hematology
2) Cardio-vascular system,
3) Respiratory system.

3] **FOLLOWING HEMATOLOGIC PARAMETERS WERE STUDIED.**

1) Hemoglobin Estimation
2) Total R.B.C. Count
3) Total W.B.C. Count
4) Determination of Blood Indices-

   MCH, MCV, MCHC, PCV, RDW
5) Differential W.B.C. Count.
6) Platelet Count
7) ESR

4] FOLLOWING CARDIO-VASCULAR PARAMETERS WERE STUDIED.

1) Anthropometric Parameters:

   A. Weight in kg.

   B. Height in cm.

   C. BMI [Body Mass Index]

   D. SFT [Skin Fold Thickness]

2) Heart Rate

3) Blood Pressure

4) SpO2 And Radial Pulse tracing By Pulse Oxymeter

5) ECG[Electro Cardio Gram] with :

   - Bipolar Limb Leads : I; II; III;
   - Augmented Leads: aVL; aVR; aVF.
   - Chest Leads : V1; V2; V3; V4; V5; V6; also;
   - P; QRS; PQ; QT; QTc; QT/QTc %; QT/RR %;
   - Axis-P; Axis-QRS; Axis –T.
   - These electrocardiographic investigations were done in resting state by ISO STANDARD automatic read out giving ECG machine.

- Prior standardization was done by company engineer stationed at VADODARA.

5] **RESPIRATORY PARAMETERS STUDIED:**

1) FVC;

   % PREDICTED;

   M PREDICTED,

2) FEV1;

   % PRED.,

   M PREDICTED,

3) FVC PRED;

   % PRED;

   M PRED,

4) FEV1;

   FEV1 % PRED,

   FEV1 M PRED;

5) FEV1/ FVC;

   % PRED

   M PRED

A Spiro gram suggesting any alteration is included if required.

3.8: *PRE REQUISITES:-*

1) Mutual introduction and providing awareness of the Purpose and Procedure to the participant.

2) Adequate privacy, confidentiality.

3) Complete apprising of this investigation to patient.

4) Comfortable and cozy ambience.

5) Informing and providing of patient information sheet.

6) Signing of informed consent paper.

7) Adequate mental and physical rest when indicated.

8) Advices regarding positions in which test is to be done.

9) Providing opportunity to be familiar with gadget.

10) Where the biomarker is prone to have variation, if feasible at least 3 repeats at comprehensive intervals to be performed.

11) Preliminary clinical history including name, age, sex, address, next of kin, case / record no / date of examination / person examining and

12) Anthropometric parameters like height, weight, BMI [Body Mass Index], SFT [Skin Fold Thickness] etc. to be determined.

13) Critical search for exclusion /inclusion criteria.

14) Any information regarding cardiac procedures in past/application of/installation of cardiac prosthetic devices implantation/ cardio-or respiratory medication undergone in recent past/presently to be noted.

15) Data relevant to past hospitalization, blood transfusion etc. to be availed.

16) Any family history of hematologic/cardio-respiratory issue must be ruled out before selection as participant.

- Trained research assistant: The investigator is a trained and qualified doctor who studied /supervised the work of co-worker who was also an experienced medical professional.

- The study was undertaken after consent of subject, on IEC [INSTITUTIONAL ETHICAL COMMITTEE] suggested informed consent sheet.

- Mutual introduction and awareness and purpose and information regarding procedure were provided beforehand.

- Face to face interview or clinical case taking was undertaken. PIS [PARTICIPANT INFORMATION SHEET] with details in it were explained to participants.

- Eligibility of participants was determined by age factor and inclusion and exclusion criteria.

- Battery of investigations as seen in authentic research literature was used.

- The physical function/anthropometry was undertaken to cover demographic assessment.

- Basic assessment data and history was multi dimensional.

- For critical assessment of respiratory function by spirometry, approved protocol was followed.[ATS Protocol]

- The physical fitness level was taken for granted by relevant systems clinically examined and how the participant evaluated his state of health as "apparently healthy". [not judged by MET by calculation]

- For **BMI ASSESSMENT**, the prevalent value determinants were utilized-as unde

  r-a]<18.5=under wt;

  b]18.5-<25=normal;

  c] 25-<30=over wt.

  d]>30=obese

  [All values in Kg. /m^2]

- The Statistical Assessment was done by standard MS Excel version.

- Fidelity/confidentiality-all investigations were done in strict confidential and safe environment, maintaining due care for human dignity and respect.

- Participant adherence /compliance was not the issue as it was a single time assessment.[two sessions]

- For Hematological study, strict aseptic care, approved norms for disposal of resultant waste, and single time sterile disposable kits were used. Also, they were done by qualified staff and by approved methods of Lab. Technology. Samples

collected empty stomach, and samples were studied as early as in 2-4 Hrs. in lab. Hematologic samples collected at similar time, so no diurnal variation could influence the value. The samples were stored at approved temperature.

- The usage of simple equipments were explained to participants, they were allowed to ask questions, and their queries were satisfied.

- Each investigation of spirometry was done by Clarity Company ISO 9001 grade Computerized Spiro Meter.

- ECG study was done by Clarity Company ISO 9001 GRADE digital automatically giving ECG read out type ECG machine, giving all 12 ECG leads at a time.

- SPO2 was studied by Omron Digital equipment displaying digitally the values of Heart Rate, and pulse wave continuously with SPO2 values.

- The Hematological parameters like CBC were studied on automatic cell counter in one 100 bed hospital having all ultra modern heath care facilities.

- Blood pressure was determined on Omron Digital Equipment-Tokyo, JAPAN brand.

- The typical case study sheet is given at end of this synopsis.

INCLUSION CRITERIA:

1) No. - 50 males and 50 females; parsons staying in Vadodara for about / more than 5 years

2) Age – 60 - 80 years.

3) Who gave consent for undergoing this study.

EXCLUSION CRITERIA:

1) Who have under gone a major hospitalization/cardiac surgery/respiratory operation/blood disease/have prosthetic device of heart, or who were taking medicines potentially influencing these critical parameters to be tested.

2) Serious medical / surgical illness / complication of blood / heart / respiratory disorder.

3) Who do not give consent for undergoing this study.

MISCELLANEOUS

Investigations:

Only those investigations relevant and/required in individual patient; this may include:

a) S. Creatinine;

b) Blood Glucose;

c) Lipid profile;

d) Routine stool; / urine;

e) any other as advised by guide

Frequency of reporting:

Regular reporting to Guide and reporting to research administration as per schedules given.

Amendment in plan of study:

Not undertaken without the knowledge of Guide.

TABLES AND DATA

TABLE 1: PARAMETER- AGE [yrs.]

CASE AND CONTROL GROUP [MALE]

	N	Minimum	Maximum	Mean	Std. Deviation
AGE (Case)	50	61	80	65.14	2.755
AGE (Control)	15	17	20	18.27	1.033

TABLE 2: PARAMETER- HEIGHT [cm.]

CASE & CONTROL GROUP [MALE]

	[Case]HT cm	[Control]HT.cm
Mean	166.92	168.87
N	50	15
Std. Deviation	5.054	5.125

Table 3: CASE GROUP [n=50] [MALE]

ANTHROPOMETRY & HEMATOLOGY PARAMETERS

	N	Minimum	Maximum	Mean	Std. Deviation
Case-AGE	50	61	80	65.14	2.755
Control-AGE	15	17	20	18.27	1.033
HT[cm.]	50	160	180	166.92	5.054
WT.kg.]	50	53	102	73.32	12.193
BMI[kg./m^2]	50	20	34	26.20	3.714
SFT[cm.]	50	2	6	3.98	1.000
Hb[g %]	50	10	18	13.68	1.285
Total RBC-[m. /cmm.]	50	4	6	4.62	.567
Total WBC-[k./cmm]	50	4300	9700	6378.00	1099.590
PCV[mm.]	50	32	53	41.76	4.221
MCV[μ^3]	50	78	100	89.10	4.799
MCH[pg.]	50	25	34	29.86	2.100
MCHC[g./dL]	50	30	33	32.40	.948
RDW	50	10	16	12.32	.935
ESR [mm. /1^{st} hr.]	50	4	20	10.12	4.547
P%	50	52	76	62.06	6.479
L%	50	20	46	35.20	6.701
M%	49	1	3	1.73	.605
E%	50	0	2	1.42	.538
B%	50	0	1	.02	.141
PLT.CNT[k./cmm.]	50	193	392	261.32	49.315
Platelet Count	50	193000	392000	261320.00	49314.666

TABLE 4: ANTHROPOMETRY AND HEMATOLOGICAL PARAMETERS IN CONTROL GROUP [n=15] MALES

Parameters in control group	N=15	Minimum	Maximum	Mean	Std. Deviation
WT. [kg.]	15	50	68	61.73	4.301
HT.[cm.]	15	160	176	168.87	5.125
BMI[kg./m^2]	15	17.3000	24.2000	21.707333	1.8565270
SFT[cm.]	15	2.0000	4.0000	2.726667	.5909637
Hb gm%	15	14.0	15.4	14.567	.4865
RBC [m. /cmm.]	15	4.5	5.0	4.820	.1656
PCV[mm.]	15	42	45	44.33	.816
- MCHC[µµg]/[g/dL]	15	31.1100	33.3300	32.471333	.8324479
MCH [pg]	15	28.00	34.76	30.8347	1.51661
MCV[fL]/[μ^3]	15	88.00	97.70	92.0213	2.57300
RDW	15	10	14	11.73	1.335
ESR[mm./1^{st} hr.]	15	10	12	11.20	.941
Total WBC[k/cmm]	15	6000	10000	8200.00	1473.577
P%	15	58	70	62.00	3.140
L%	15	25	38	33.33	3.792
M%	15	2	5	3.20	1.082
E%	15	1	2	1.33	.488
B%	15	0	1	.20	.414
PLT. CNT.[l/cmm]	15	140000	300000	196666.67	47609.523

TABLE 5: [FEMALE] CASE [n=50]

ANTHROPOMETRY & HEMATOLOGY PARAMETERS

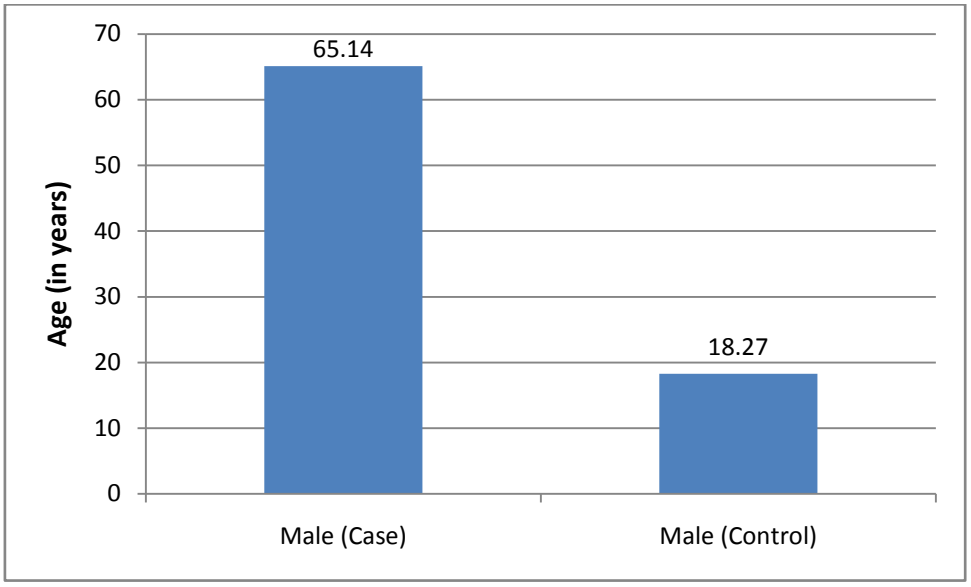
	N	Minimum	Maximum	Mean	Std. Deviation
AGE[yrs.]	50	60	74	64.20	3.620
HT.[cm.]	50	140	164	154.58	5.055
WT.[kg.]	50	44	92	60.58	10.327
BMI [kg./m^2]	50	21	36	25.74	3.691
SFT[cm.]	50	2	6	3.80	.857
Hb[g %]	50	6	15	11.52	1.798
PCV[mm.]	50	21	45	36.80	5.533
MCHC [g./dL]	50	28	33	31.36	1.396
TOTALRBC [m./cmm.]	50	3	5	4.04	.283
TOTALWBC [k./cmm]	50	3800	11000	6499.40	1569.872
MCV[μ^3]	50	57.00	106.00	85.5286	9.71392
MCH[pg/]	50	16	33	27.94	3.857
MCHC[g./dL]	50	28	33	31.66	1.423
RDW	50	10	16	13.04	1.603
ESR[mm./1^{st} hr.	50	4	30	12.60	4.832
P%	50	46	68	58.90	5.530
L%	50	28	49	37.50	4.950
M%	50	0	6	2.56	1.358
E%	50	0	2	1.18	.629
B%	50	0	0	.00	.000
PLT.CNT. [l./cmm]	50	1	6	2.68	1.039
PLATELET Count	50	100000	560000	272720.00	94585.894

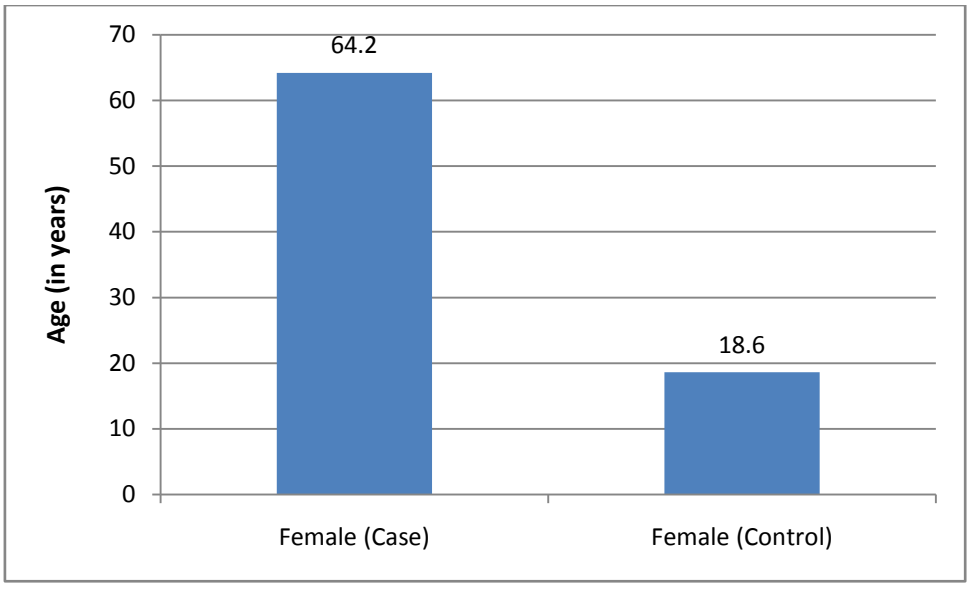
TABLE 6 : FEMALES[n=15] CONTROL GROUP

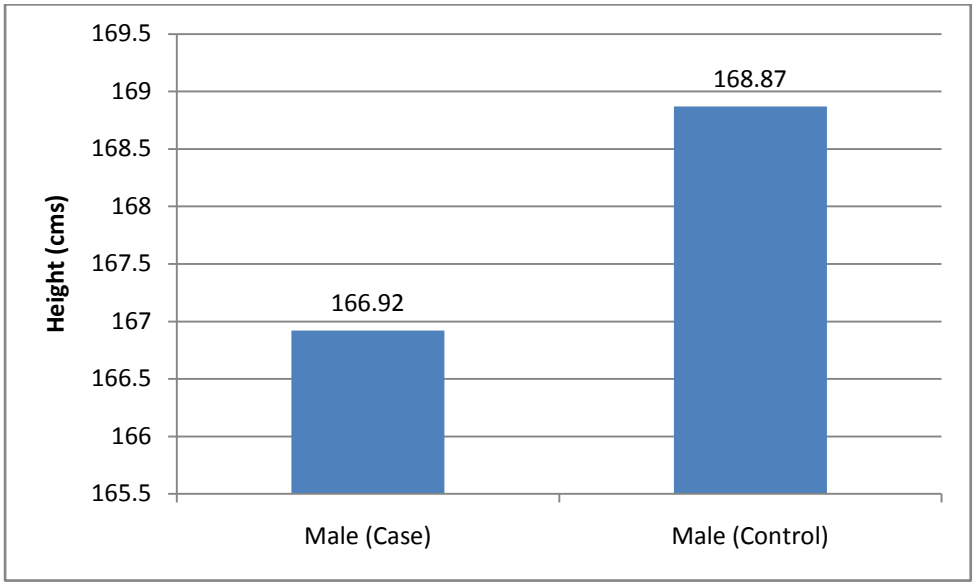
ANTHROPOMETRIC AND HEMATOLOGIC PARAMETERS

AGE-yrs	15	17	20	18.60	1.056
WT-kg	15	50	60	55.60	3.582
HT-cm	15	150	162	156.20	4.004
BMI[kg/m^2]	15	22	26	22.93	1.223
SFT[cm]	15	3	4	3.40	.507
Hb-G%	15	13	14	13.33	.488
RBC-m.	15	4	5	4.80	.414
PCV%	15	41	43	41.93	.704
MCHC%	15	30	33	31.73	.961
MCH μμg	15	20	30	27.60	2.293
MCVμ^3	15	83	93	88.67	3.244
RDW	15	10	14	11.60	1.056
ESR mm/1hr	15	8	13	10.87	1.727
WBC k/cmm.	15	4.000	10.900	7.520.00	2.201363
P%	15	58	70	64.00	4.192
L%	15	23	36	29.67	4.030
M%	15	4	5	4.53	.516
E%	15	1	3	1.73	.594
B%	15	0	1	.07	.258
PLATELET COUNT. lakh/cmm	15	1.40000.00	3.20000.0000	2.22666.666667	.52571.9461672

PERTINENT GRAPHS







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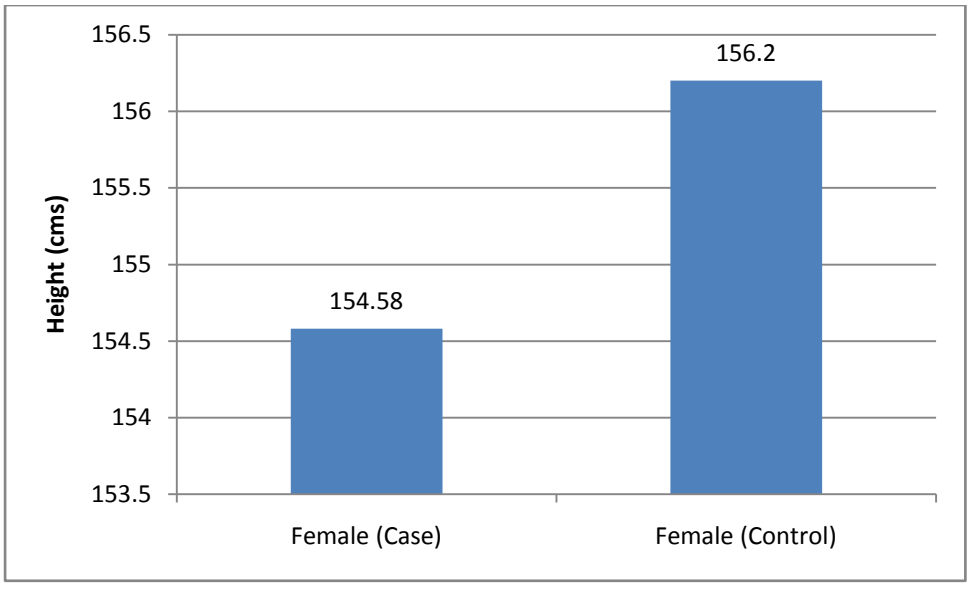

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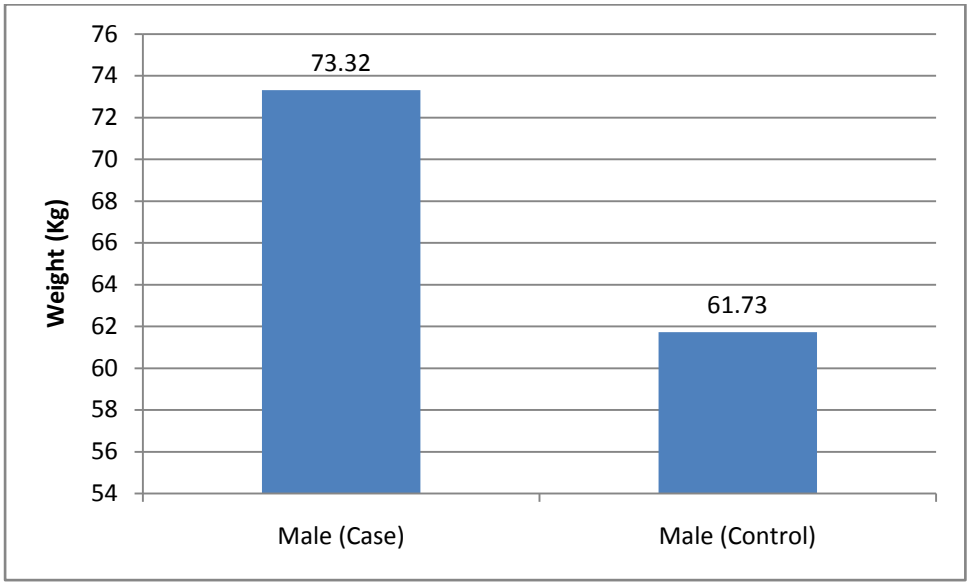

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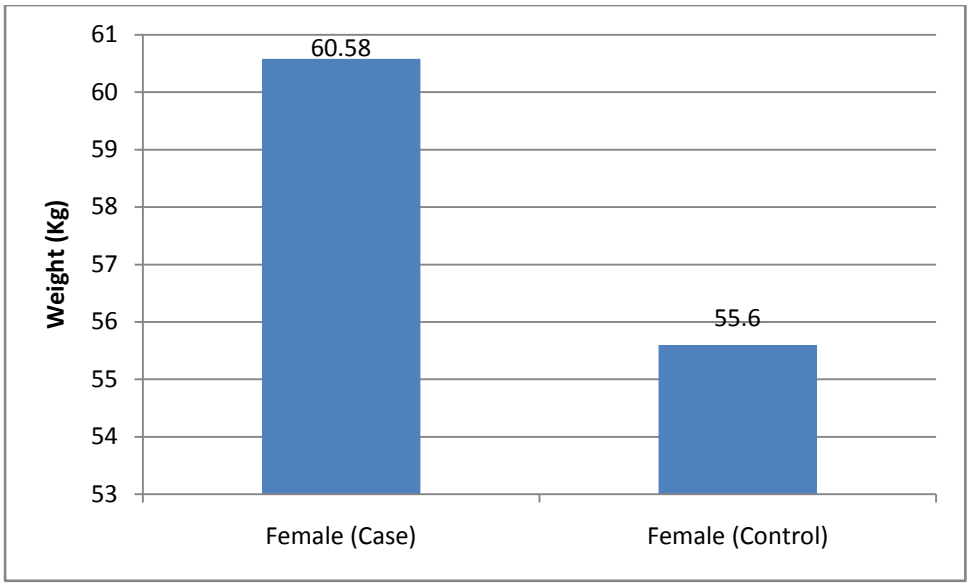

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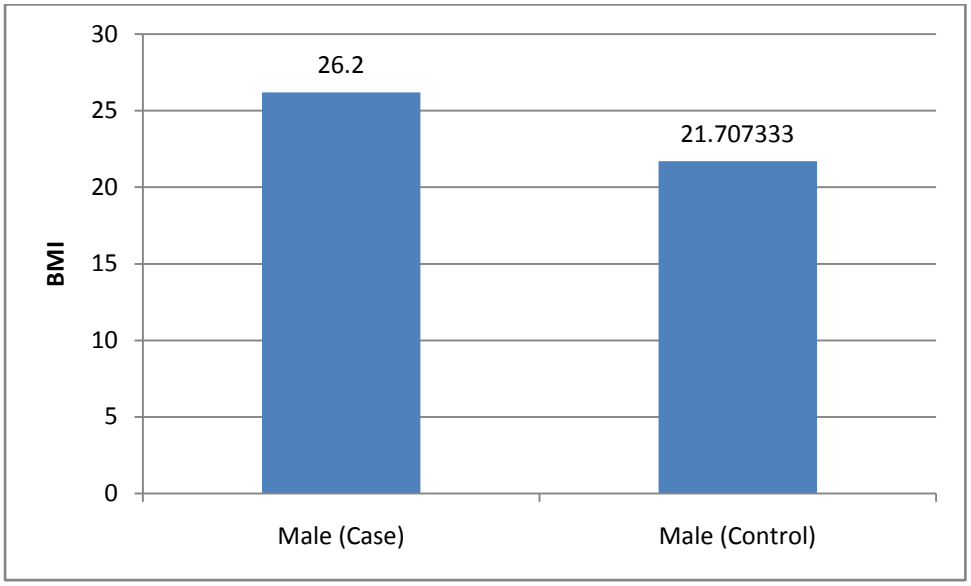

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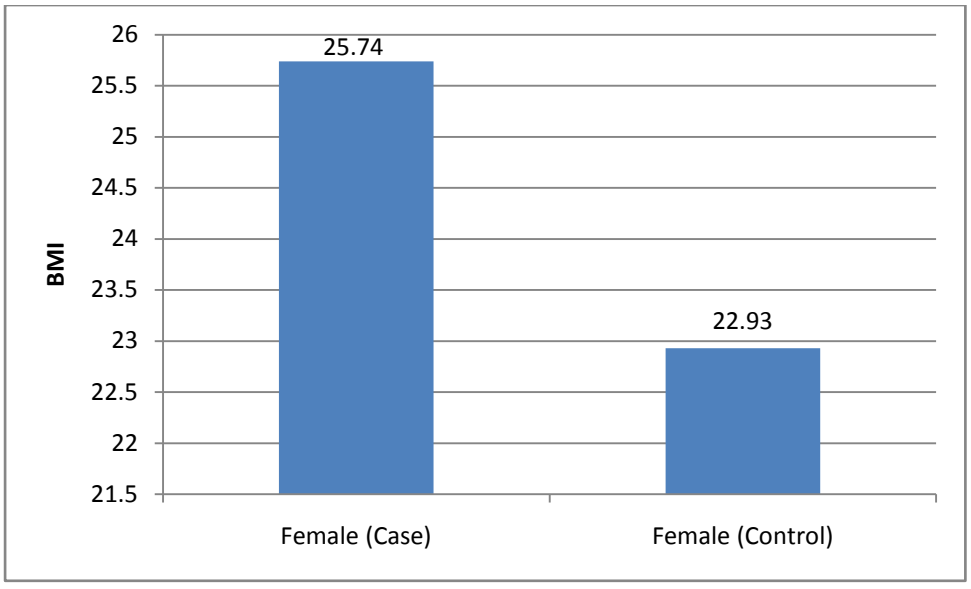
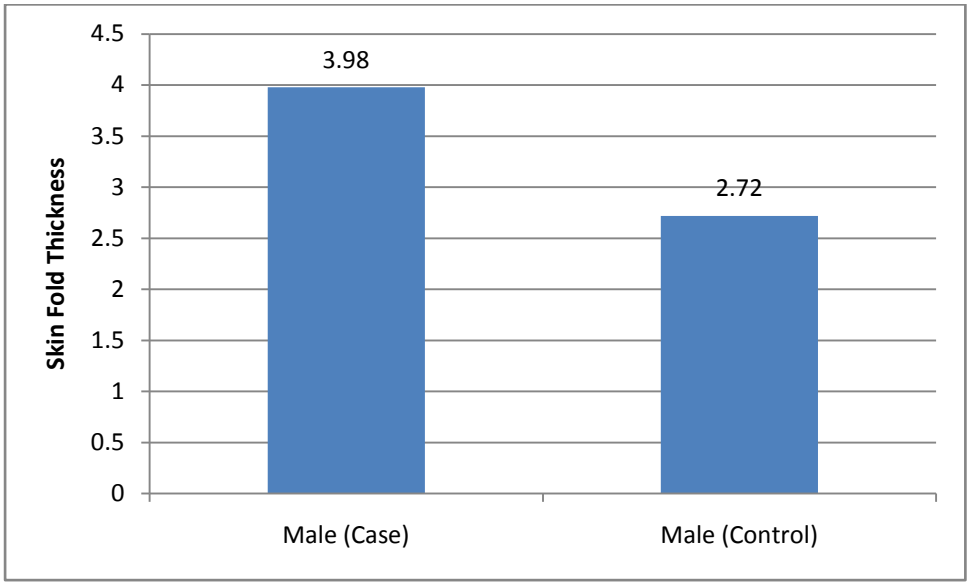


t = 2.8874, df = 63, P value = 0.0053



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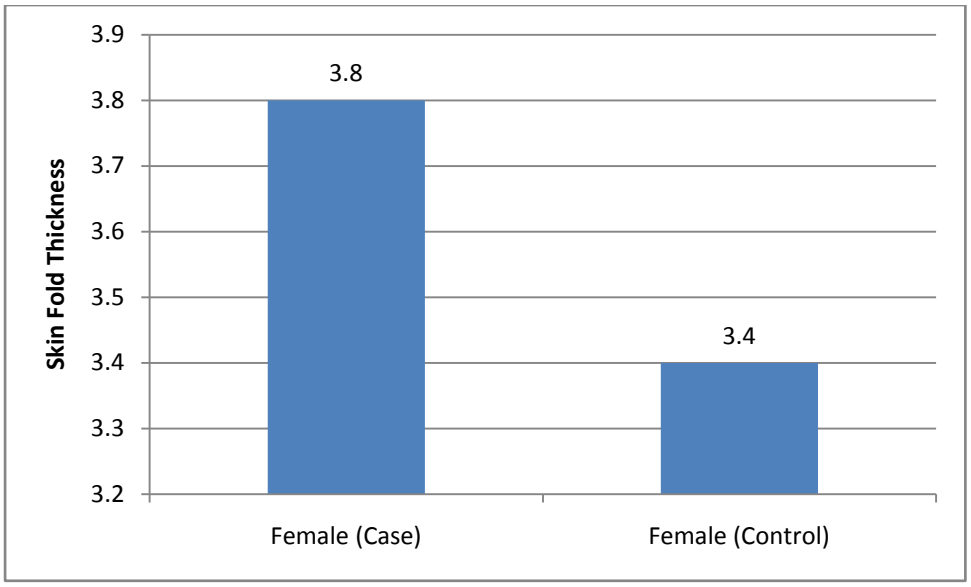

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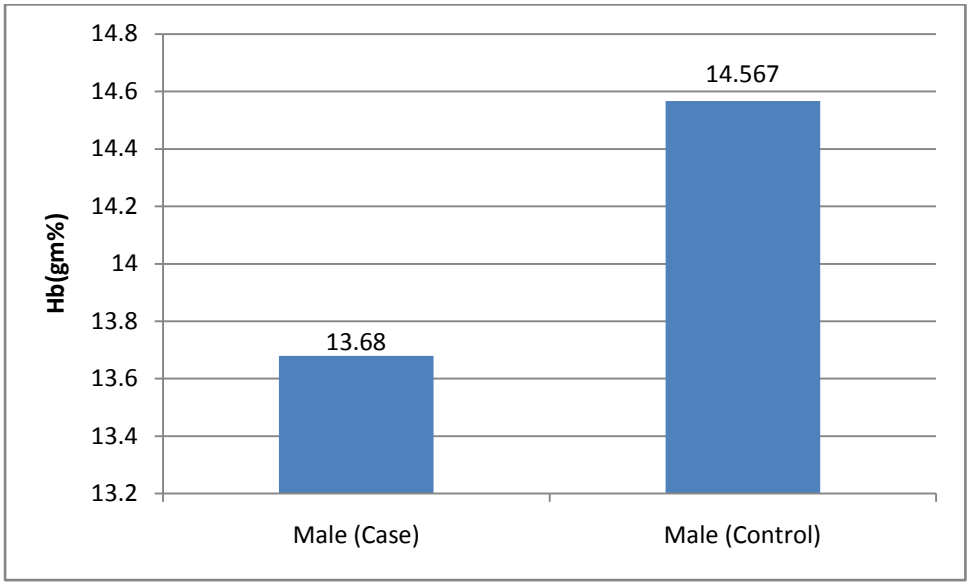

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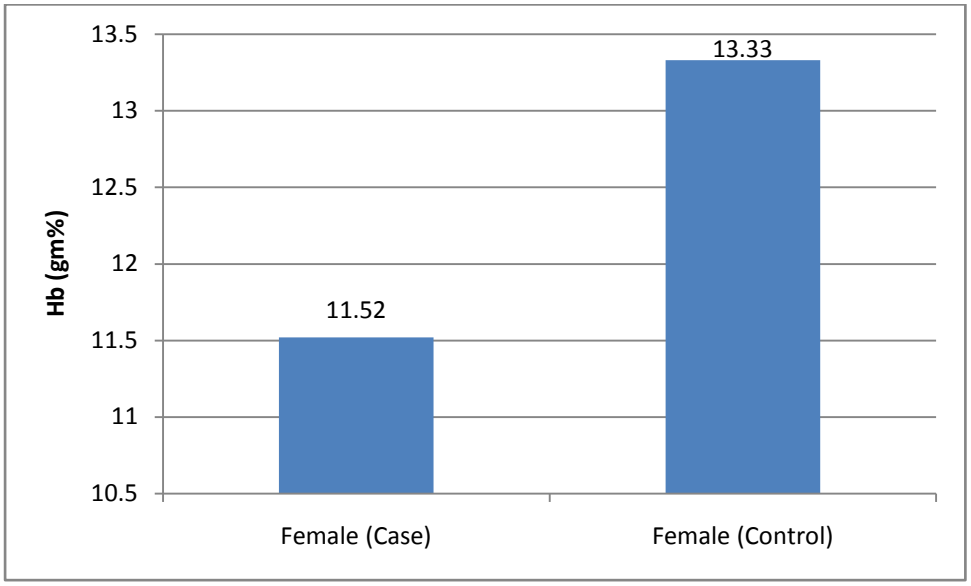

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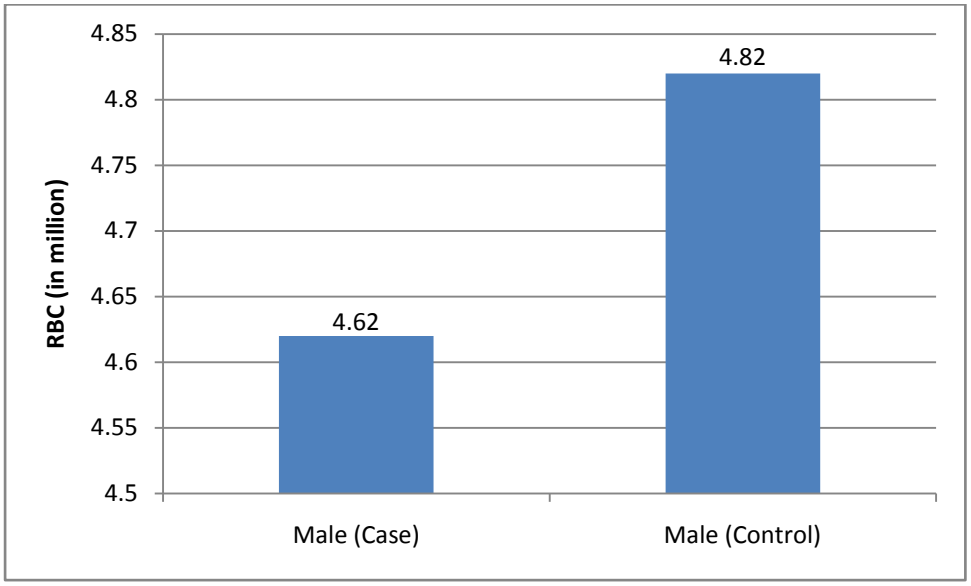

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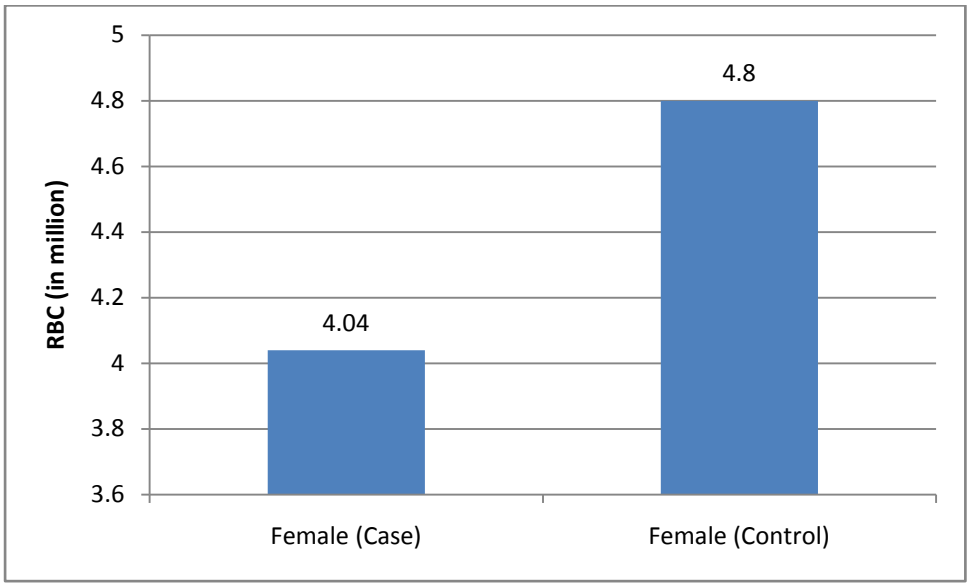

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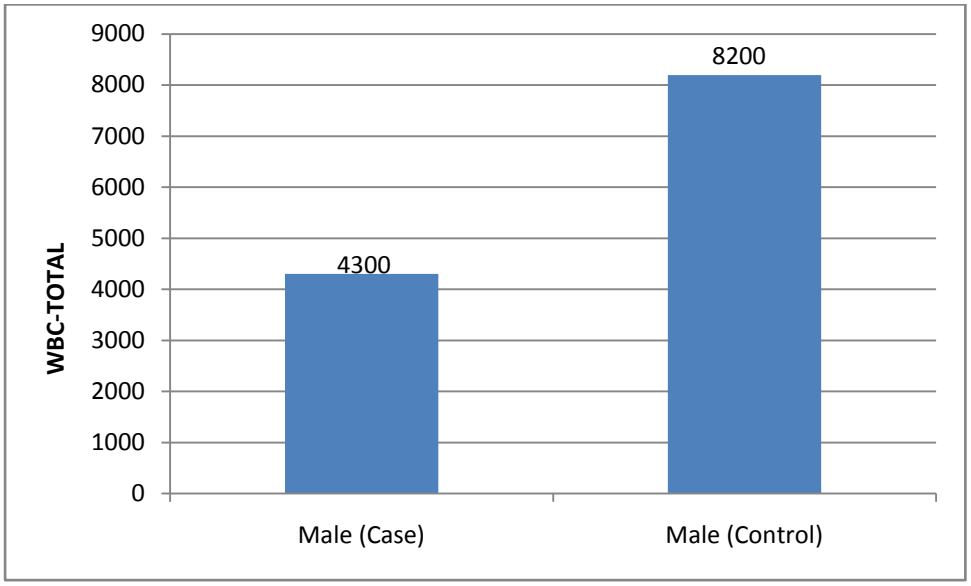

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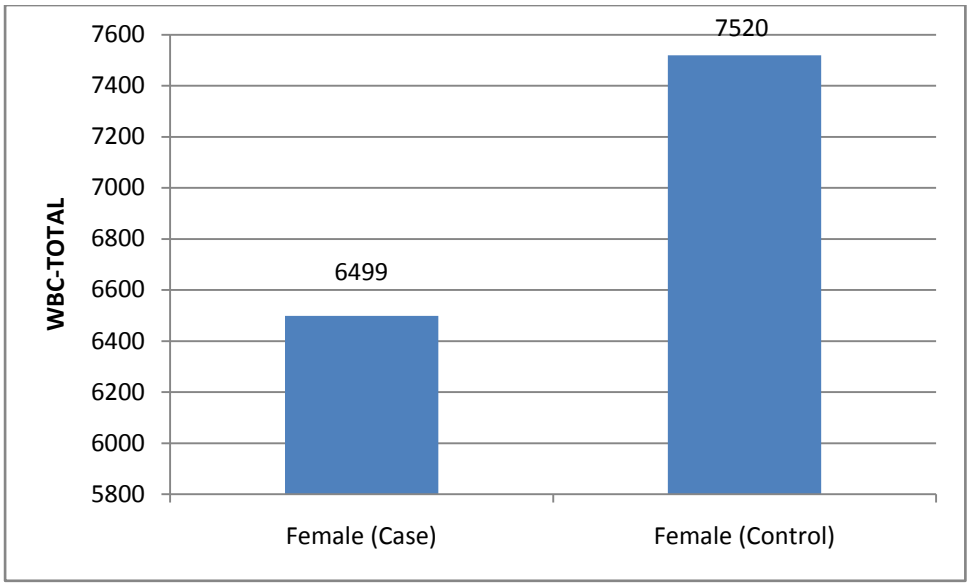

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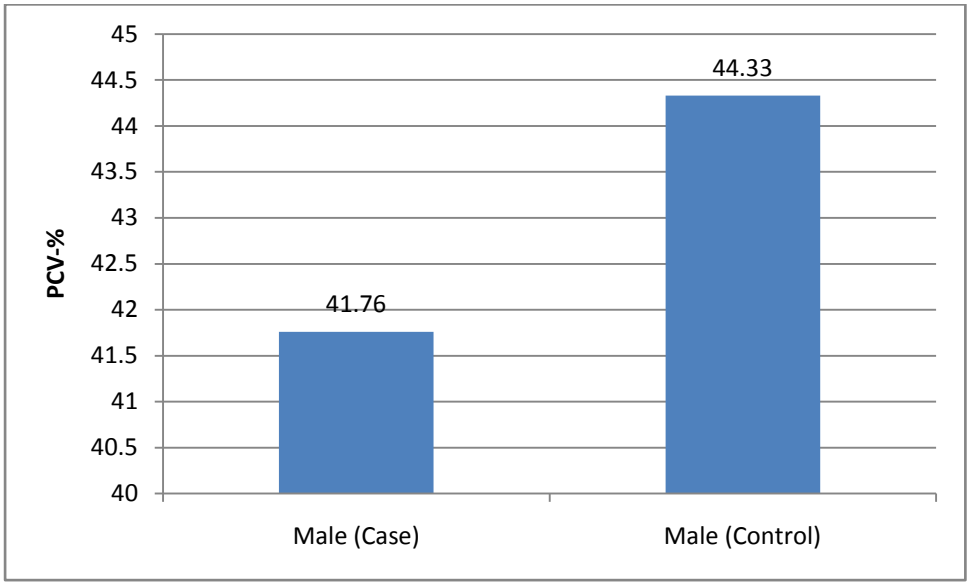

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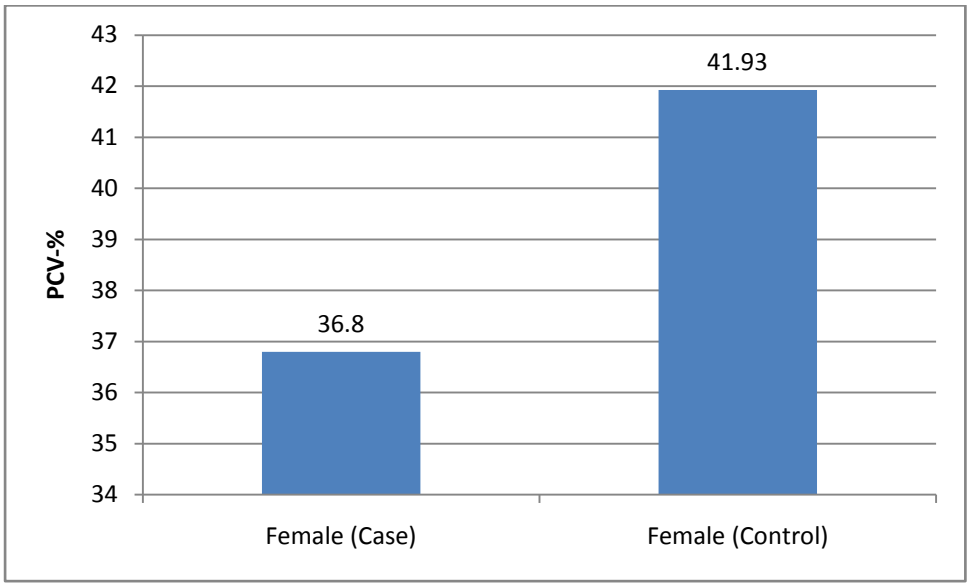

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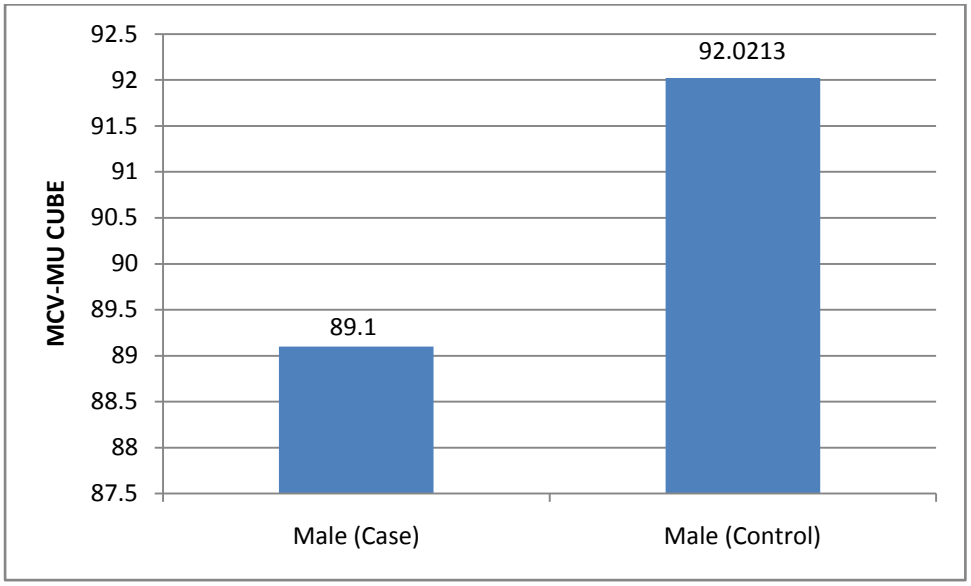

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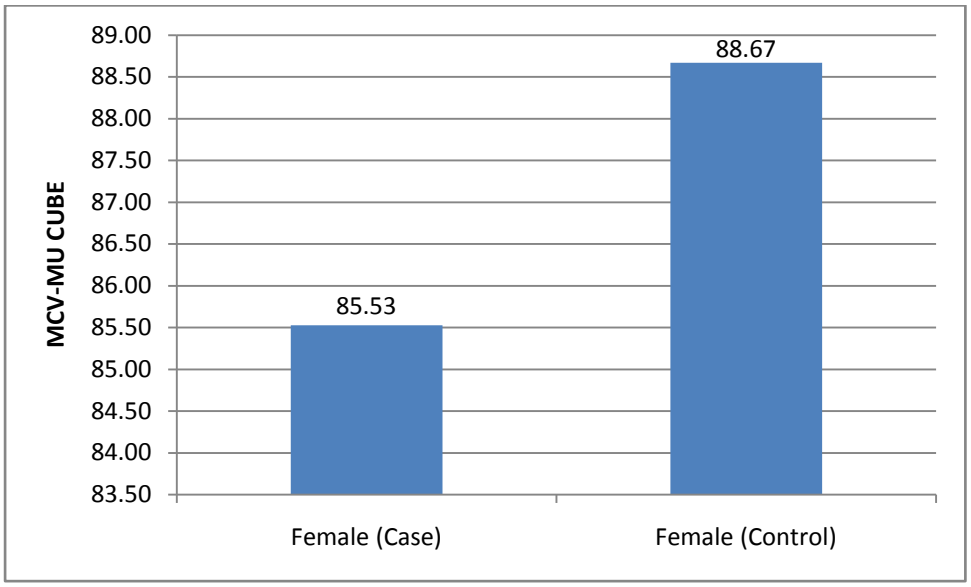

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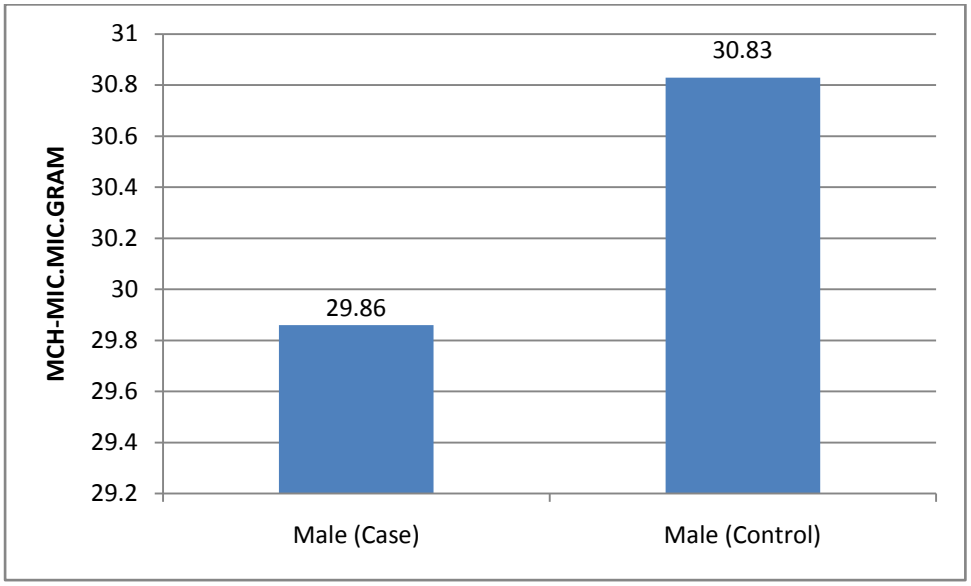

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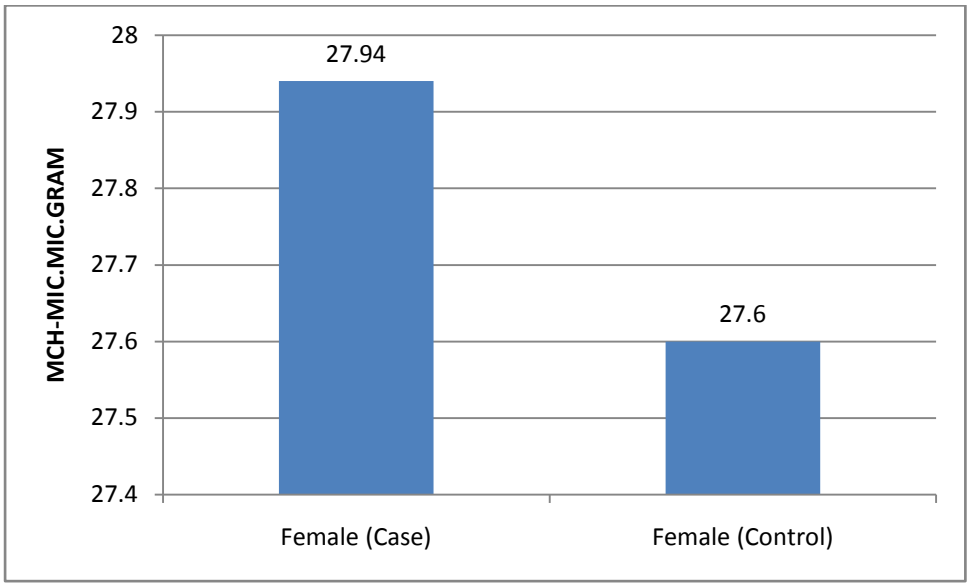

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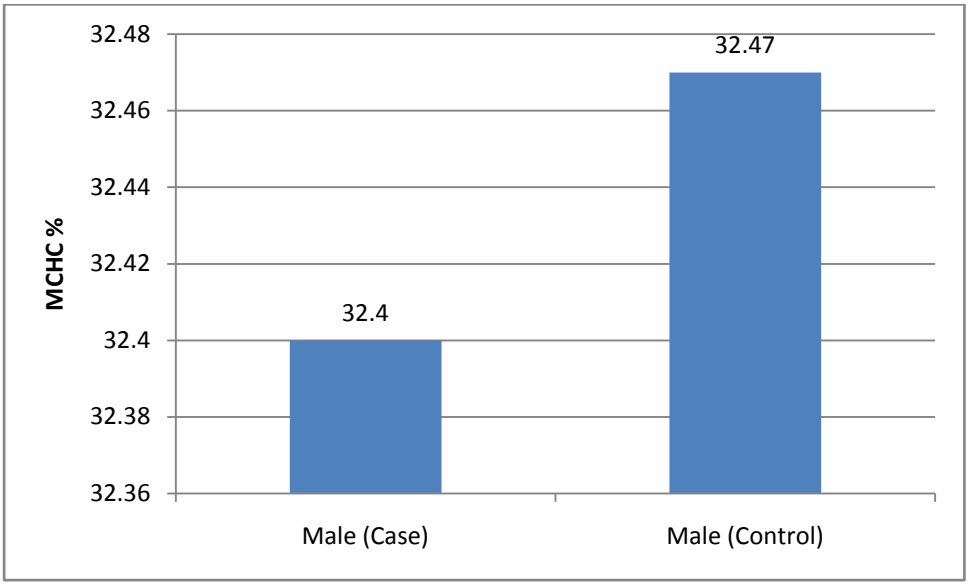
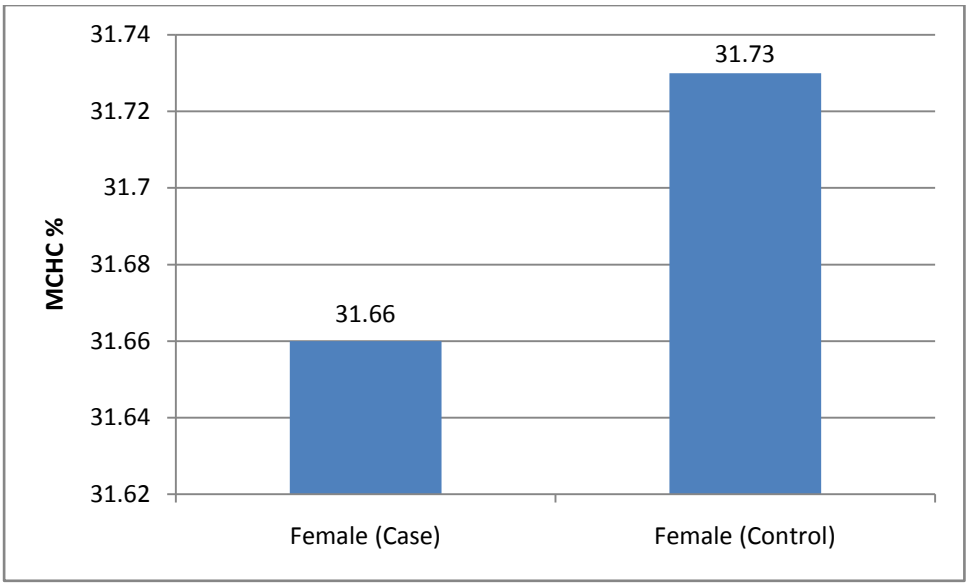


t = 0.2604, df = 63, P value = 0.7954



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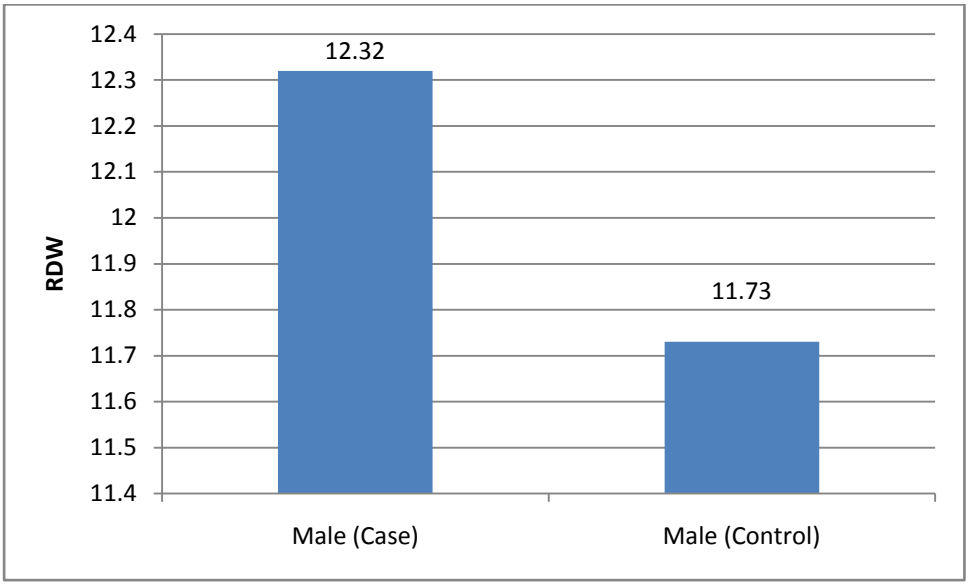

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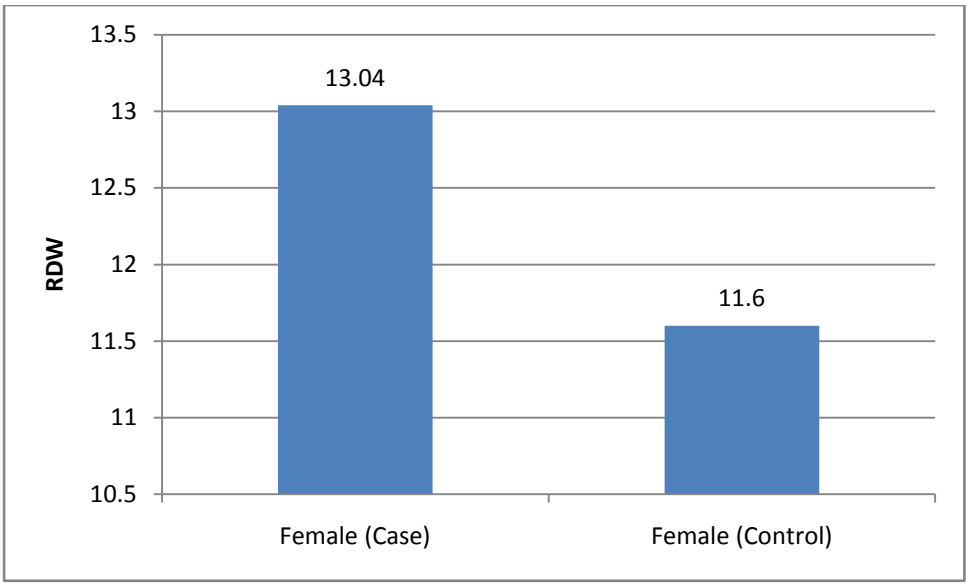

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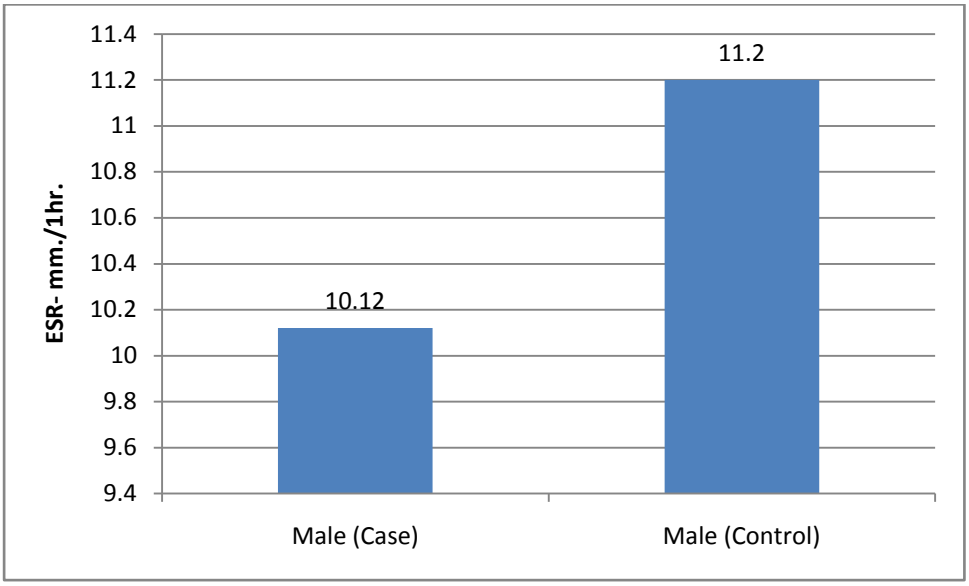

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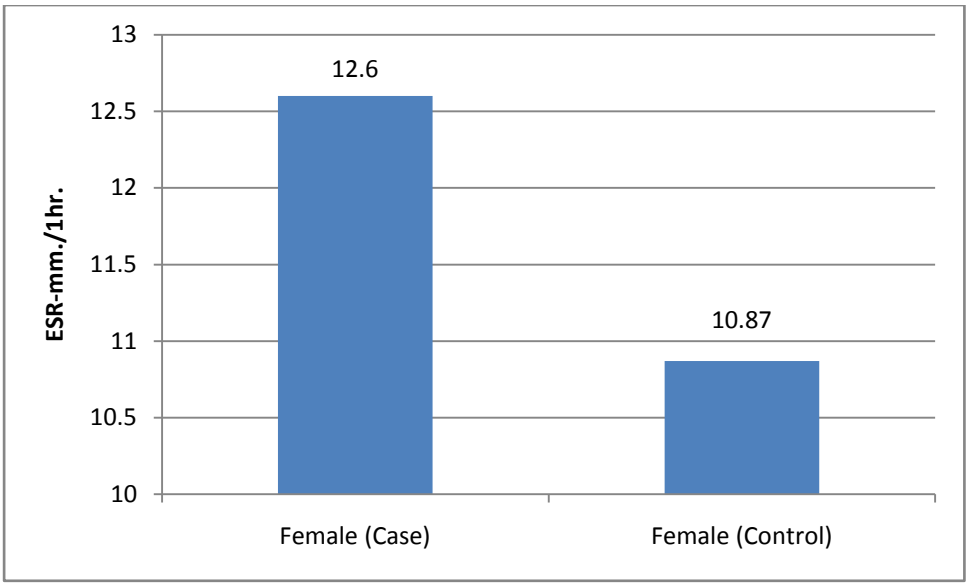

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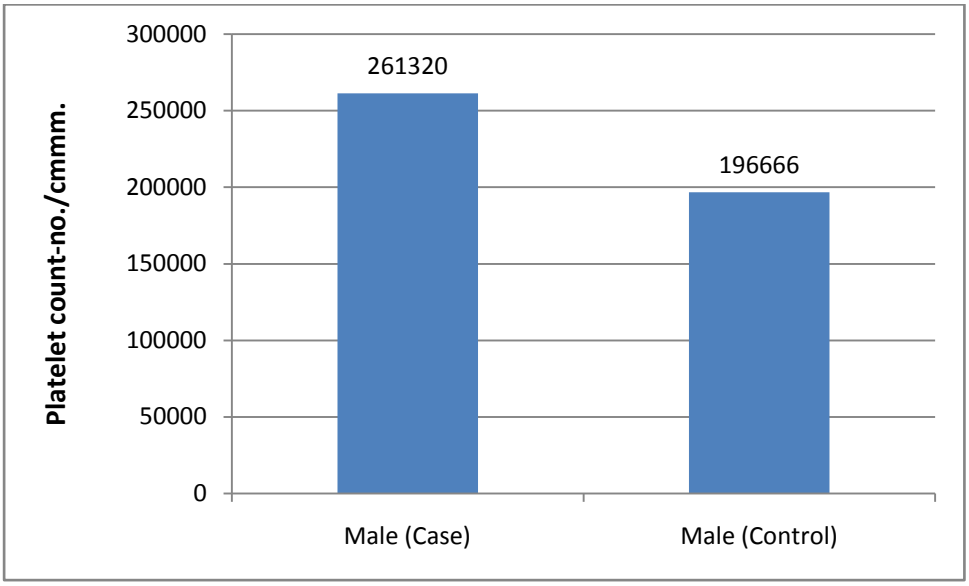

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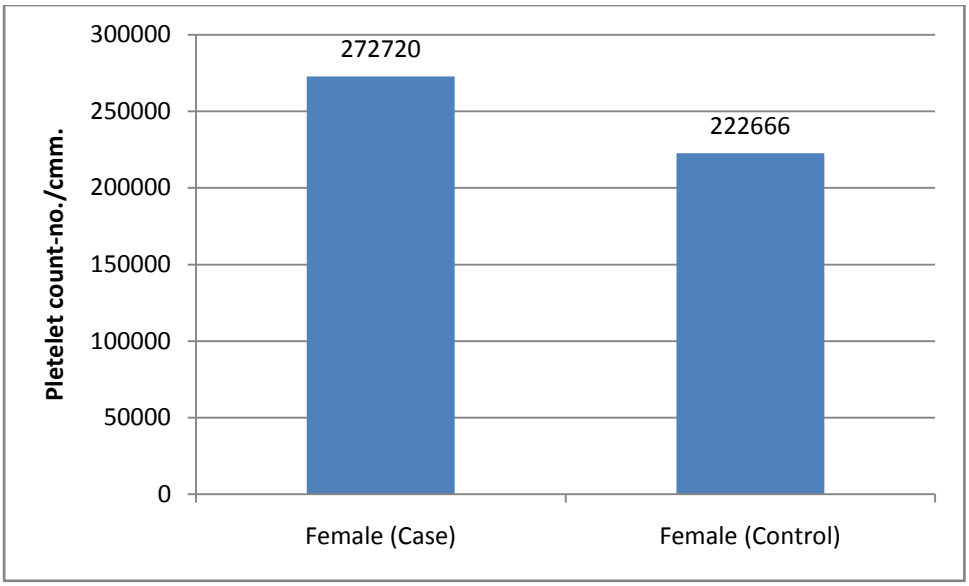

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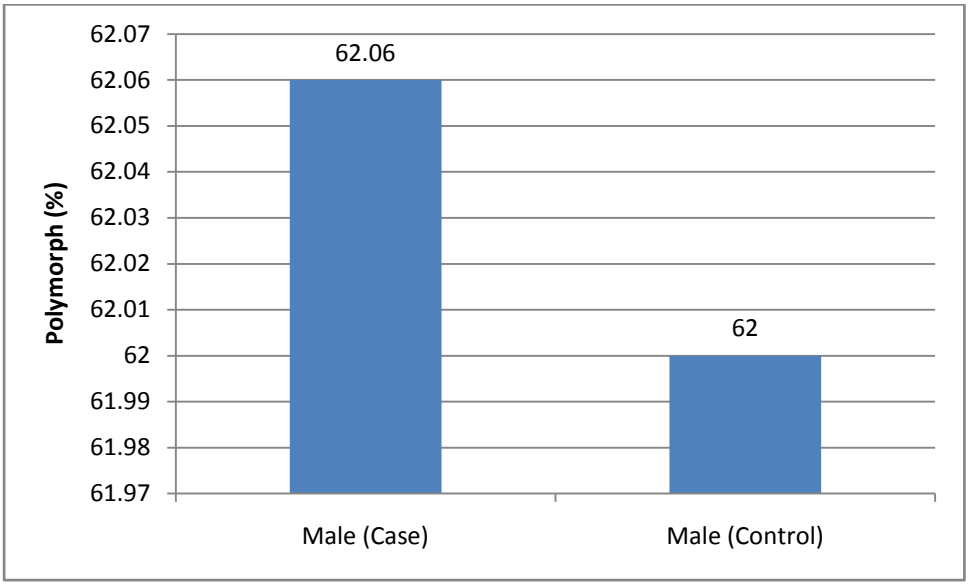

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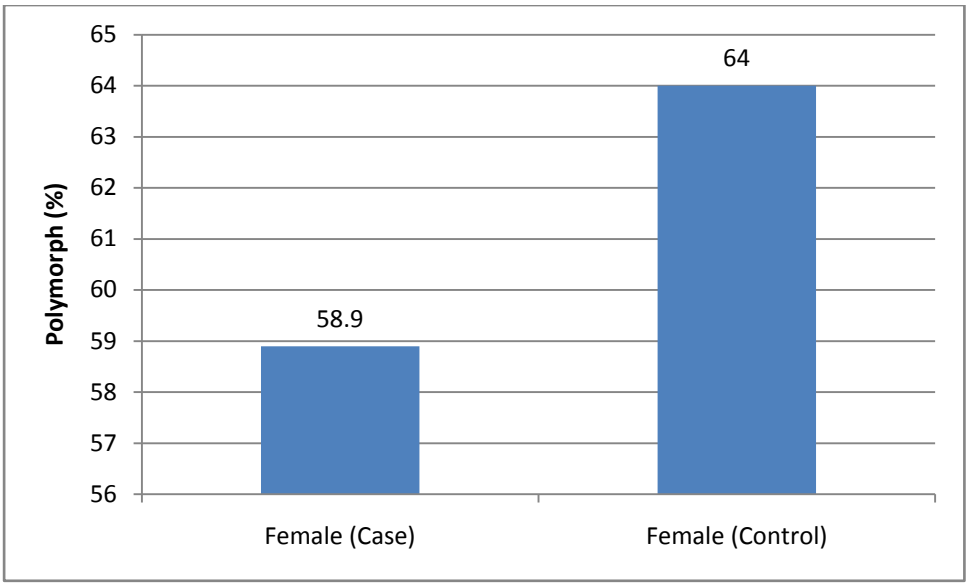

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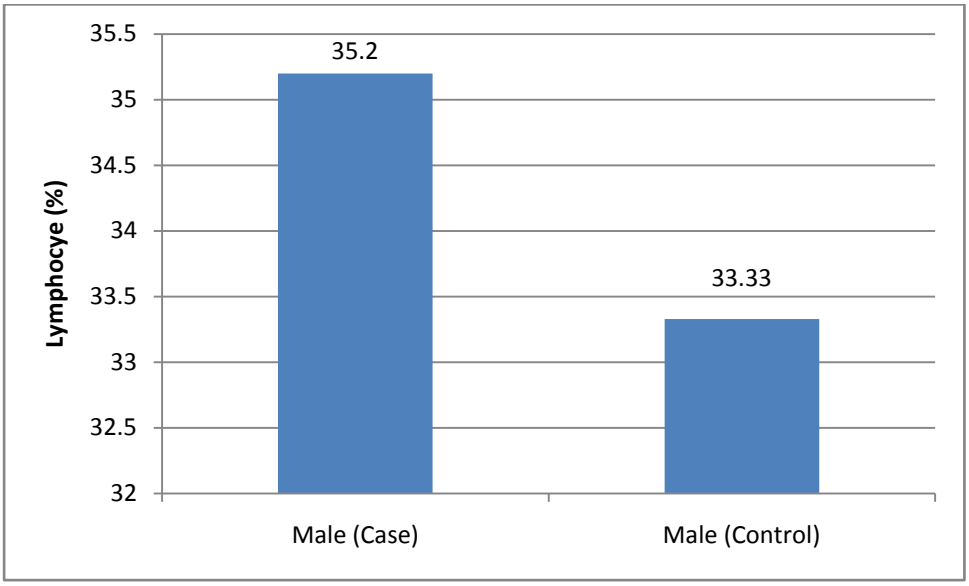

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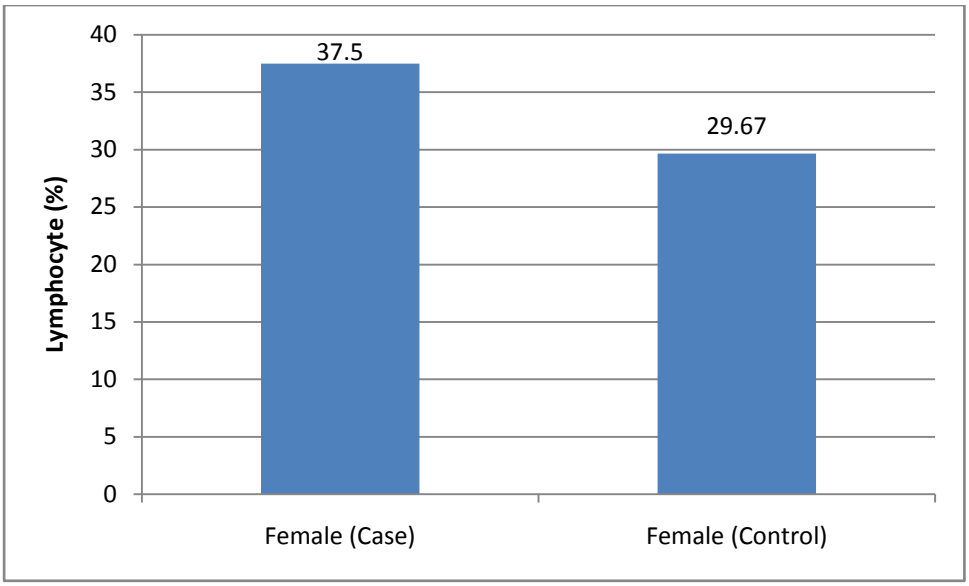

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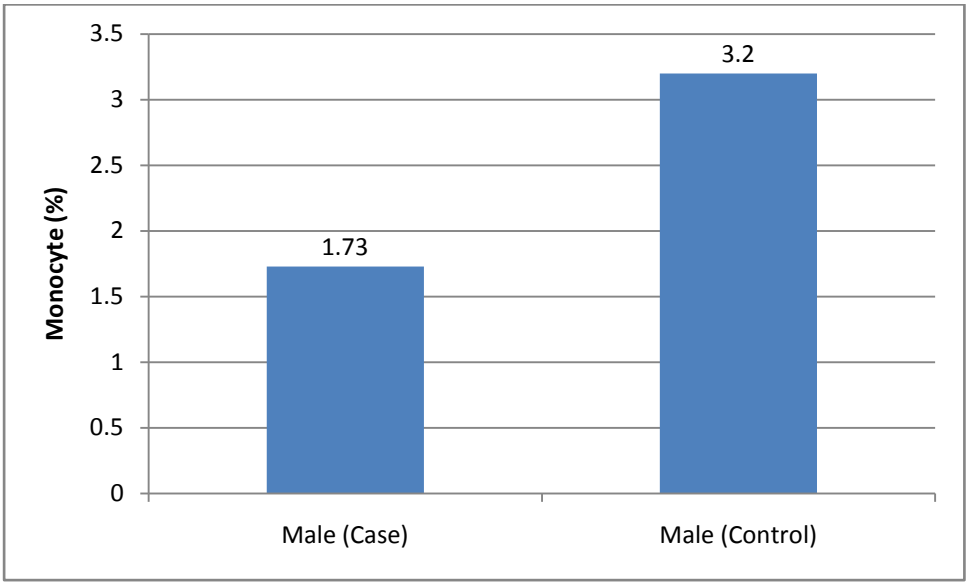

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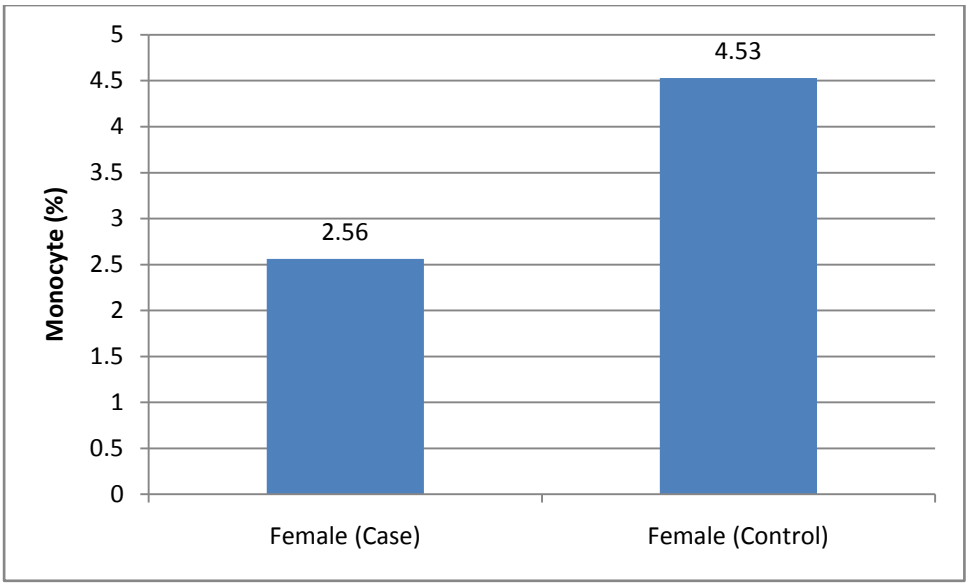

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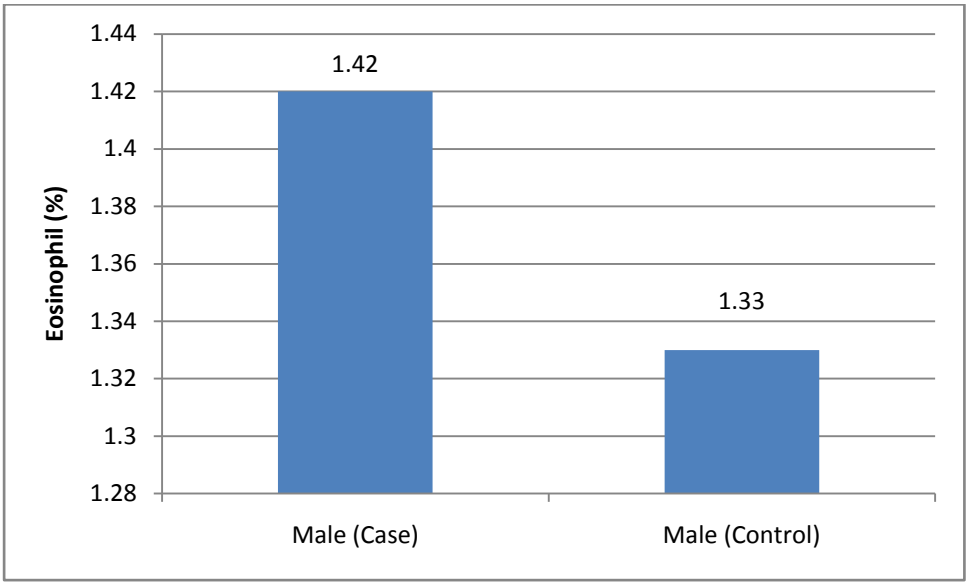

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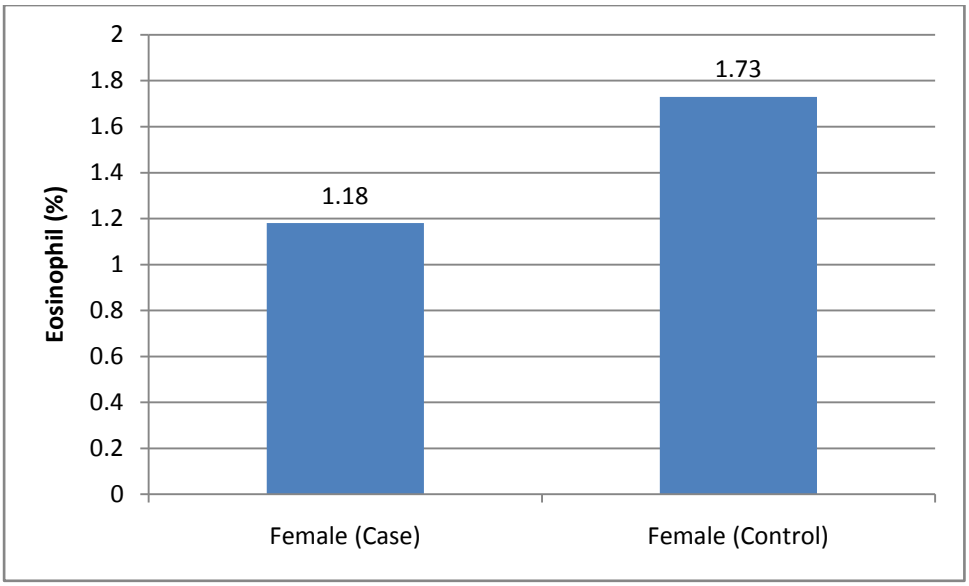

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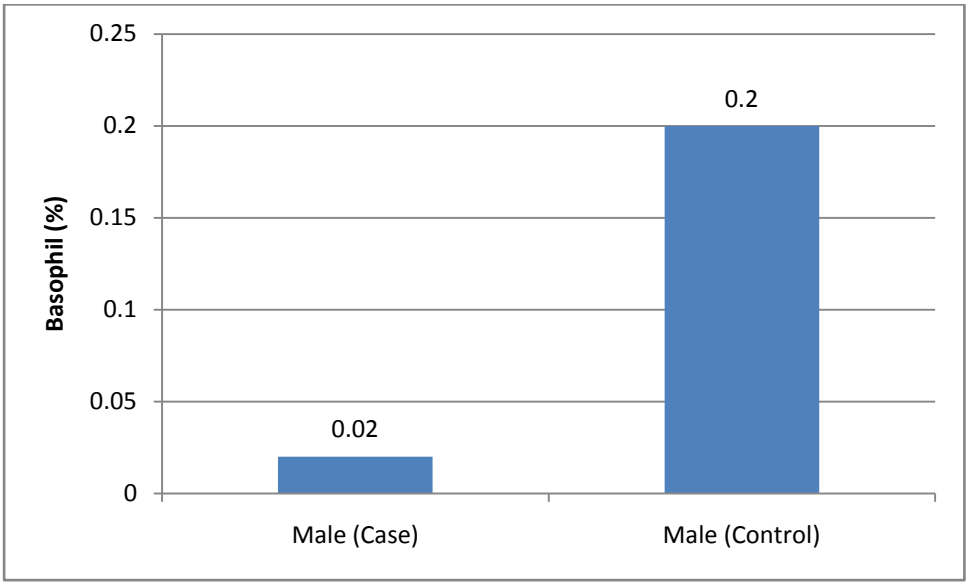

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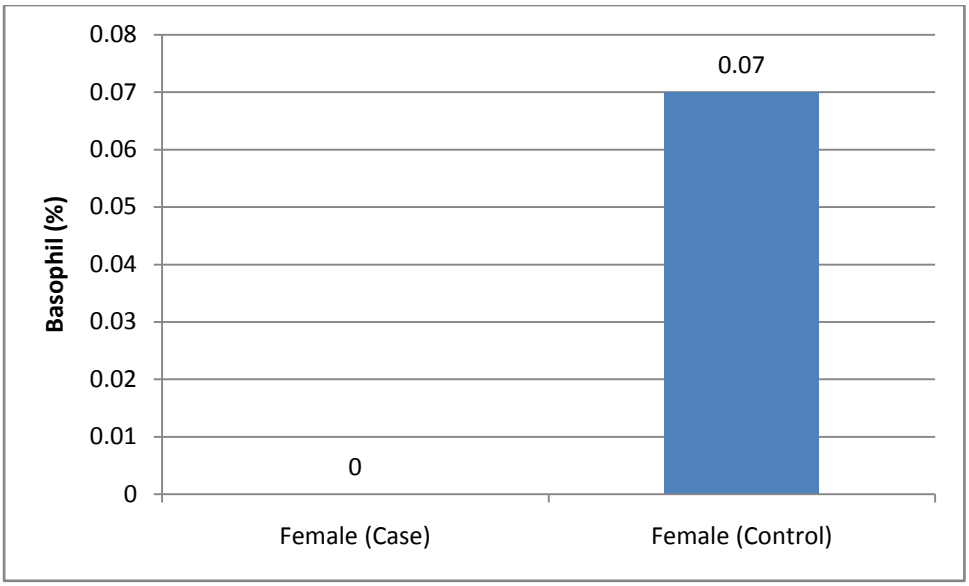


TABLE 5 : ANALYSIS – MALE-CASE[n=50] & CONTOL[n=15]

CVS AND RESPIRATORY SYSTEM PARAMETERS.

paramater	**Male-case-[n=50]**	**Male-control-[n=15]**
HR[BEATS/MIN]	86.02	71.87
SBP[mm. of Hg.]	138.28	119.33
DBP[mm.of Hg.]	80.85	78.8
SPo2 %	97.5	97.87
P wave[mS]	104.46	105.87
QRS[mS]	97.64	104.2
PQ[mS]	165.5	138
QTmS]	381.56	401.33
QTc[mS]	401.78	389.47
QT/QTc[mS]	95.54	97
QT/RR[mS]	43.1	41.07
Axis-P	61.56	18.67
Axis-QRS	22.46	56.2
Axis-T	44.14	54.4
FVC	3.5702	5.87
FVC M PRED	2.38	5.8
FVC %PRED	113.3	97.27
FEV1	3.287	4.2
FEV1 M PRED	6.58	4.33
FEV1 %PRED	79	102.2
FEV1/FVC	3.10686	
FEV1/FVC M PRED	79.936	78
FEV1/FVC %PRED	99.2	102.87
FEF 25-75	1.99	3.88
FEF 25-75 M PRED	1.86	3.65
FEF 25-75 %PRED	92.86	93.87

TABLE 6 : ANALYSIS – FEMALE CASE[n=50] & CONTROL[n=15]

CVS AND RESPIRATORY SYSTEM PARAMETERS

Variable	Female (Case)[n=50]	Female (Control)[n=15]
HR[beats/min.]	85.78	73.53
SBP[mm. of Hg.]	135.82	117.6
DBP[mm.of Hg.]	81.08	77.33
SPo2%	97.7	97.87
P wave[ms]	103.34	105.87
QRS[ms]	97.8	107.73
PQ[ms]	160.5	141.33
QT[ms]	385.28	403.33
QTc[ms]	434.42	387.87
QT/QTc[ms]	88.7	96.13
QT/RR[ms]	21.94	40.27
Axis-P	27.58	17.53
Axis-QRS	19.78	59.07
Axis-T	43.44	54.07
FVC	2.32	4.8
FVC M PRED	2.58	4.8
FVC % PRED	108.9	99.73
FEV1	1.64	3.93
FEV1 M PRED	1.88	3.87
FEV1 % PRED	110.8	97.07
FEV1/FVC	68.82	80.13
FEV1/FVC M PRED	72.56	75.33
FEV1/FVC%	105 .78	94.33
FEF25-75	2.02	3
FEF25-75 M PRED	3.3	3
FEF25-75 %PRED	98.3	94.87

DISCUSSION

1. *Aging and genetic aspects in brief:*

In the chapter of Introduction, a brief presentation of a number of personalities of long age is given, with an intention that, when a person has a long life, which is healthy and devoid of complications related to aging, obviously this may be associated with retarded Homeostenosis of critical parameters.

Similarly there has been study of centenarians and the genes associated with aging. Heather E. Wheeler and Stuart K.Kim [1] state that "very little is known about the specific genes that affect the rate of aging or human life span"

They have also given the tabulated form of summary of gene association studies in long lived individuals. These studies pertaining to genes like APOE (ε4 allele of Apo lipoprotein E, as done by Corder E. H. et al. [2] and also, by Kervinen K. et al. [3]

Similarly the role of MTP (Microsomal Transfer Protein) as a marker associated with life span is given by Geesaman B.J. et al. [4]

Like wise, many other genetic studies related to APOC3 (Apo lipoprotein C3), by Atzmon G.et al. [5] and IGFIR (Insulin Growth Factor 1 Receptor mutation study by Suh Y.et al. [6],

Longer telomerase length and association with hTERT (Human Telomerase Reverse Transcriptase is shown by Atzmon G. et al. [7]

Studies related to Asian and European population with longevity and FOXO3A (Forkhead Box 03A) transcription factor are quoted by H.E. Wheeler and S. K. Kim, throwing light on studies related to serum Iron, Vitamin $B_{6,}$ Vitamin $B_{12,}$ plasma Arachidonic acid, plasma eicosa pentanoic acid, and many other age related trait studies done by study groups like BLSA, FHA, INCHIANTI, SardiNIA having excellent scientific consistency.

It seems that where there are less age related issues of homeostenosis, the longevity is determined by advantageous molecular scenario created by appropriate genetic function.

These authors have also presented association of parameters like BMI and weight in these age related critical traits in research of Framingham Heart Study. Keeping this in mind we also did the anthropometric study of elderly group.

The DNA Microarray characterization has lead to a new approach of analysis called 'Genomic Convergence' This according to authors may help better understanding of aging organ or tissues, and genotype of tissue or organ specific aging genes can have predictive values about declining of function. In future there is good hope for predictivity of homeostenosis as what authors say will provide new dimension to age related functional decline.

Heather E. Wheeler and Stuart Kim have given vivid account relating to genetic polymorphism and longevity, stating the role of ε4 allele polymorphism in genetic etiology of cardio-vascular disorders.

Atzmon G. et al. studied centenarians and long telomeres; (this is interesting as most aging individuals die of usually, hematological or cardio- respiratory disorder and cannot reach the centenary age.)

In our study, the selected anthropometric, hematological, cardiac and respiratory parameters of 50 males and 50 females in age range of 60-80 years were examined, and compared with 15(<4:1 ratio) of apparently healthy counterpart participants in the age range of 17-20 years; because in this young age, there is optimum development of these organ system, yet, they do not have age related changes of senility.

.As anticipated the values of different variables in case of females were less than values in case of male participants.

2. Aging and Hematologic study:

Alexander Panda et al. [8] have given an account of human immune senescence and while describing this part, author states that this part of aging related innate immune senescence is incompletely understood. They have mentioned role of diverse cells like neutrophils, mono cytes and eosinophils as well as basophils in this context.

This indicates to focus on the corpus of information in age related hematologic changes.

The hematological reference or normal values in form of intervals were selected from various source [9, 10, 11] and compared. Although there was nominal difference among them, but by and large, they were near one another. The sources

selected did not mention standardized reference values for elderly group or aging population; and hence the assessed value was compared with the young adult values

Some experts believe that “Iron can react with oxygen species to form free radicals; leading to protein damage accumulates with age.” And mentioned that too little iron causes anemia and too much iron may be toxic. As such, this indicates necessity to undertake hematologic assessment in aging population.

Sunita Wickramsinghe and Geffrey McCullough [12] have mentioned that, there is reduction in the amount of trebecular bone and haemopoiesis, accompanied by an increase in fat cells but only in sub cortical regions, in addition, other cells normally present in the bone marrow such as lymphocytes, plasma cells, and mast cells may increase in bone marrow of older people.

Chiu Wah Tsang et al. [13] studied hematologic indices in an older population sample to derive the healthy reference values. These authors mention that the reference values for elderly may differ from those of young people. These authors have given 11 series from different authors giving details of commonly employed hematologic parameters. Two of these series are having large population number between 1000-2000 participants, yet many are in range of 100-200 subjects, this sample size may be perhaps suitable for determining reference values, however the sample size of series of Zauber N. and Zauber A. [14] and Jarnigan J. et al.[15] have sample size nearer to our study. All these authors have presented parameters like Hemoglobin value, Hematocrit, Mean Corpuscular Hemoglobin, Mean Corpuscular Volume, Total W.B.C. count, Total Platelet count, and some biochemical relevant tests. In our study, in addition we did differential W.B.C. count, Mean Corpuscular Hemoglobin Concentration, R.D.W. [Red Cell Distribution Width] and Erythrocyte

Sedimentation Rate. [E.S.R.] Chiu Wah Tsang et al. have studied non Indian subjects who differ in many ways like diet, ethnicity, life style etc. and their objective for study is also different yet in general our results are comparable to their findings. In Indian population study of Preeti Jain et al. [16] and Padalia M.S. et al. [17] have close similarity to our findings. A.J. Sinclair, J.E. Morley and Bruno Velas in Pathy's Principles and Practice of Geriatric Medicine [18] mention that, the cause of low hematologic parameters in aged is by reason that there is decrease in bone marrow reserves in response to high demand. These authors have mentioned 7.0 % prevalence of iron deficiency anemia at 50 years of age, but according to Chaves, Asher, Guralink et al.[19] by 80 years it goes above 30 %[31.4%],however, the idiopathic anemia of aging occurs in 23.0 % of aged population, due to hemopoietic stress. Also, Pennix B. W. Pahor and Cesari M.et al.[20] have stated that it is due to debility and diminished muscular performance and muscle strength, but Ershler W.[21] has focused on cytokines in causation of anemia in aged. It is noteworthy that Zauber N.P. And Zauber A.G. [22] hold that with aging the hemoglobin level does not change significantly.

Joosten E., Pelemans W. and Hiele M.et al. [23] mention that along with a large number having undiagnosed anemia, prevalence rate in chronic disease associated anemia in geriatric population is 35-40 %, Iron deficiency anemia about8-15 % and vitamin B_{12} deficiency anemia is about 5.0 %.

Pathy's Principles and Practice of Geriatric Medicine [18] have given an elaborate list of causes of age- related anemia. Accordingly, it may be due to life style changes, like, shopping, cooking, feeding, GIT issues, hormonal issues, neuro-endocrinal issues, or alcoholism, lipid phobia, dementia, bereavement, psycho- social

disturbances, malignancy, GIT infections, neurologic issues, effects of medicines, effect of Opoids, role of Ghrelin, Neuropeptides, CCK, GLPYY, Leptins, role of cytokines, and issues of Oraxin A/ B

It is estimated that aging reduces food intake by about 30 % and may cause anemia according to authors of Pathy's Principles and Practice of Geriatric Medicine thus this account of nutritional anemia in aging population is clinically also impressive for diagnosis or differential diagnosis of etiologic mechanism operating in a particular case.

The above mentioned factors are not the target problems of thesis and are presented only to demonstrate the plurality of etiologic mechanisms related to homeostenosis of hematologic parameters.

When compared with young counterpart, values of Hemoglobin, PCV, and Mean Corpuscular Hemoglobin Indices were less in aged population as shown in graphs and tables; although, all indices were within normal limits of reference values shown, related to the parameter, in general.

In one study, done recently [24] about elderly population of Vadodara city, there was decrease in comparable values in mentioned parameters with increase in MCV. This was not the case in this study; but, instead of the megaloblastic picture, hematological picture suggestive of iron deficiency was seen in this study. This Suggests that there may be pockets of differing presentation types of in aging population in city, and this being study with small size of population cannot provide any conclusion about the type of anemia affirmatively. It was also noted that however, that the values were close to normal limits in most of the cases. The similar studies [16, 17] done elsewhere gave comparable results.

This indicates need to focus on the corpus of information in age related hematologic changes.

Study of Cardio-vascular homeostenosis in aging population:

Desler et al. [25] maintain that, "aging has been demonstrated to reduce the fidelity of myocardial mt DNA resulting in reduction of maximal respiratory capacity. Aging therefore further sensitizes the heart to acute and chronic stress, lowering the threshold of damage the heart can endure."

In this study, the values of SPO2 in male as well as female subjects were within normal limits and as such no abnormality is detected in these findings

The radial pulse tracings were showing as per expectation, the changes of heart rate variability common in this age groups, the effect of respiration was also as expected, but as shown in photograph, in rare case occasional low volume beats were noted which too were asymptomatic and hence, not critically suggestive of any noteworthy correlation is discussed.

Heart rate, Rhythm changes, the arterial blood pressure changes in SBP, [Systolic Blood Pressure] DBP, [Diastolic Blood Pressure], and the pulse pressure changes are parameters having bearing and important correlation to disorders of Cardio-vascular system in aged; hence the study of HR[Heart Rate], ECG[Electro-Cardio-Gram] (all 12 Leads), and blood pressure assessment were done.

Fleg J. L. and associates, [26] mention that in supine position, at rest, the heart rate in healthy men does not change with aging. Tsuji H. Larson MG, Venditti FJ et al.[27] state that beat to beat fluctuation of HR commonly known as heart rate variability , steadily declines with age also, as quoted by EG Lakatta and Daniel

Levy[28] , reduced heart rate variability is an indicator of cardiac autonomic regulation commonly found in older people and has been linked to increased and fatal out comes.EG Lakatta et al. in same article also hold that isolated Atrial Premature Beats (APB) appear on resting ECG in 5% to 10 % of subjects older than 60 years and are generally not associated with heart disease;

Increase in prevalence and complexity of both supra ventricular and ventricular arrhythmias whether detected by resting ECG, ambulatory monitoring or exercise testing occurs in otherwise healthy older patients but not in younger persons, also short bursts of PSVT 1%-2 % are seen in apparently healthy individual older than 65 years who were rigorously screened to exclude disease, according to EG Lakatta and Daniel Levy. We found only one case of such ventricular rhythm disturbance as ectopic ventricular beat.

By quoting Hiss, (1960), Simonson & Keys,(1952),Simonson,(1961) Best and Taylor[29], have described details of characteristic changes of ECG associated with aging, like P-Q, P-R, Q-T prolongation in ECG of elderly, with decreased voltage changes in P, R, and T waves, and axis changes of P and QRS waves, with aging. Our observations are shown in the graphs and dedicated tables. In our observation, P wave changes were more common as anticipated as well as, only one case (2 %) of asymptomatic ectopic bizarre ventricular complex.

JD Pathak [30] has done mile stone study [in 1975] in his monograph of Indian elderly where he has shown HR(mean) as 75.9 beats per minute in males and 76 beats per minute in females, which our corresponding findings are as; 86 beats per minute in males and 85 beats per minutes in females. Arterial blood pressure in his series was-systolic- 100-204 and diastolic as 60-130 mm of Hg. He has also given

hypertension values derived by different authors of that time, however, many of those values are not in practice today. Whereas in our series systolic blood pressure value was138 mm Hg. in males and 136 mm of Hg. in females whereas diastolic in males was 80 and in females was 81 mm of Hg.[by digital B.P. apparatus].

While presenting ECG changes JD PATHAK mentioned that, in his series, 2/3 of participant population had no abnormality and 1/3 had only minor abnormality. Our findings are expressed in tables and graphs related to ECG changes.

He states, occurrence of about 8.3% [15/180] ECG anomalies in his series of participants, where as we found about 10 % such anomalies but practically all were of innocent and asymptomatic. He had many extra systole cases [15] and [6] Brady cardia, we had almost all cases of P wave changes and only one case of ventricular bizarre complex.

O P Sharma et al.[31] have mentioned probable occurrence of LVH in over 50 % of people, older than 65 years, but in our study [though the sample size is small, we had asymptomatic cases of LVH perhaps, because of exclusion criteria, (where we attempted to exclude such occurrence) and also probably, due to selection of participants had uncomplicated and well gratified daily unaided living with lot of supportive role of their councils and associations, medical health care, adequacy of recreational and physical activities and safer ambience, here in this series, cardiovascular disease is perhaps not as prevalent as 50 % as OP Sharma et al. have observed.

These authors have also presented association of parameters like BMI and weight in these age related critical traits in research of Framingham Heart Study. Keeping this in mind we also did the anthropometric study of elderly group.

Study of Ring and co- workers (1959) as quoted by Best and Taylor, found that blood flow from fingers show a fall from 4.77 to 2.76 ml. per finger volume per minute, between age of 40 and 60 years. Oxygenation at alveolar membrane and response of peripheral blood vessel to heat/ cold is due to change in speed of response rather than final degree of vaso dilatation or vasoconstriction, according to Kety-1956 (Best & Taylor) [29].

SpO2 in our study indicated mild to insignificant change, as it is 97.5[Mean] in males and 97.7 [Mean] in female elderly.

The demonstration of resistance to heart rate variability and higher rise of heart rate with sub maximal exercise as compared to younger group may be due to perhaps impairment in regulatory mechanisms.

Best and Taylor[29] have demonstrated that, work, power, and rate of work of both ventricles diminish significantly with aging, still however, it is also mentioned by quoting work of Burrows and associates, by these authors, that although the tissue succino-oxidase enzyme levels reduce, the isolated intra mitochondrial succinooxidase activity is not decreased.

This may perhaps tempt to hypothesize that the metabolic dysregulation is perhaps less influential than neural or higher central regulation in performance characteristics of ventricular efficiency in aging persons.

According to J.D.Phatak, [30] normal range of heart rate as set by AHA is 50-100 beats per minute.

He observed the mean heart rate as 75.9 in males and 76 beats per minute in females.

In this study, the mean HR in males is 86.02 Beats per minute and females 85.78.Beats per minute which is higher than values demonstrated by Pathak but still in normal limits. This finding may be because of white coat effect. Our findings of elderly group's blood pressure – Systolic, Diastolic and Mean Blood Pressure is comparable with those of other investigators.

The basal blood pressure as mentioned by Pathak, in 140 old males is 136.9 mm Hg. (Mean) Systolic; and in 40 females (old) is 142.3 mm Hg. (Mean) Systolic; and Diastolic (Mean) blood pressure was respectively 83.9 and 82.7

For the study of ECG, we took the help from book of Tomas Gracia[31], and Leo Schamroth.[32]

Schamroth has mentioned about cardiovascular "Normality and Abnormality" stating that, Electro cardiographic abnormality may occur in normal healthy persons and in absence of organic heart disease; and also, Organic heart disease may occur with normal electrocardiographic patterns.

Respiratory System Homeostenosis:

O.P.Sharma [33] while giving changes in elderly, upper respiratory structures, chest wall, Respiratory muscles, lung structure changes like shallow alveoli, increased diameter of alveolar duct and Respiratory Bronchioles described. Decrease of Mean Bronchiolar Diameter, which is the main determinant of air way resistance, is said to decrease significantly and this may be the leading clue to FEV1/FVC changes.

Author of Fishman's Pulmonary Disease and Disorder [34] has given numerous changes associated with aging in Respiratory System, like tissues of lung, in airways, changes in mechanical properties, surface forces and also changes in macro molecules in aging lung which are useful to understand Respiratory Homeostenosis of aged. Lung parenchyma changes like those in pulmonary alveoli and bronchiolar dilation are described. Increase of Mean Linear Intercept, decrease of surface: alveolar volume ratio, net decrease of 15% in alveolar surface area, diminished recoil pressure at defined lung volume, decreased Gas / Liquid interface and surface area of lung are important age related changes treated in depth by them. Moreover, increase in pleural and pulmonary elastin and d-Aspartic acid with changeover to ^{14}C.

Murray and Nadal have described many respiratory changes in elderly individuals. [35]

Lowery E.M. et al. [36] have given many salient observations of age associated changes in their article. A.P. Fishman et al [34] have expressed that age related changes in connective tissues *do not* provide sufficient explanation for diminished elastic recoil found in aging.

Also structural molecules like elastin etc. are affected in such a way that there is diminished elastic recoil and diminished pulmonary compliance. Due to trapping of air in the small air ways, diminished elastic recoil, diminished force of strength of diaphragm and other respiratory muscles and thoracic stiffness. R.V. increases; but VC, PEFR, FVC, FEV1, and FEV1/FVC decrease with aging. FRC is mentioned to have increase with aging. DLCO and SaO2 and PaO2 diminish. Air way reactivity is increased and so also FRC and RV. [Our SpO2 value indicates mild to nil degree of depression]. Respiratory drive for hypoxia and hyper carbia is reduced.

Above mentioned changes clearly describe that these changes conjointly play role in producing COPD, ↓VC, ↓FEV1 / FVC and ↓PEFR.findings.

These observations clearly support the findings of Respiratory Homeostenosis observed by us particularly the FEV1/ FVC and PEFR are diminished in female elderly, because of perhaps contribution of hormonal and psychosocial factors along with factors described by various experts as given above.

The observations of Christopher Dyer and Carlos A.Vaz Fragaso et al. [37] give in depth aspects of mechanisms of respiratory functions and structural alterations and aging.

Also Gulshan Sharma, James Goodwin [38] have given an account of effect of aging on respiratory system physiology and immunology and tabulated presentation of anatomical and physiological changes of respiratory system with aging. As mentioned above, FEV1, FEV1/FVC, PEFR, values diminished in our subjects well correlate with the findings of these authors.

The table and graphs of each individual parameter with min, max, mean standard deviation, *df, 'p'* value etc. are given along with our findings.

The Computerized Spiro meter can give MVV (Maximum Voluntary Ventilation) and SVC (Slow Vital Capacity) but manufacturers of Spiro meter Software have indicated that these assessments are strenuous workouts and hence we did not determine these parameters for our participants.

SVC is assessment of FEV.2L- FEV - 1.2 L can help diagnosing large airway obstructions. These SVC positive individuals are not selected by exclusion criteria on the ground of their having large air way obstruction. Our subjects, particularly female elderly had a mild degree of COPD which is in accordance to Pathak's observations wherein he states that, FEV1 of both the sexes is about 70%.

This supports our finding of lower vital capacity and FVC in females due to smaller built and poorer musculature.

We have not attempted to assess Respiratory Efficiency Test like 40 mm Hg. Test etc. due to obvious reason of susceptibility of aged participants particularly females to respiratory strain.

From study by Pathak on Senior Citizens of India where Respiratory Efficiency Test, Maximum Breathing Capacity and Breath Holding Time was also quite low and only 9 % to 13 % could reach the normal young adult level. So these tests are omitted by us as the results are shown to be clearly very low.

The NHLBI / WHO Global Initiative for Chronic Obstructive Lung Disease Workshop summary mentions that "a low peak flow is consistent with COPD but has

poor specificity because it can be caused by other lung diseases and by poor performance."

Our subjects could perform well with, rather preferred conventional PEFR meter than Computerized Spiro meter. The existence of lung diseases was ruled out at an early stage of clinical examination so our findings of PEFR are by this uncomplicated instrument. However, the instrument we used meets Euro scale standards.

Respiratory changes in aging are well summarized by Gulshan Sharma and James Goodwin [38], as well as by Lowery EL, et al. [39].

In literature 2 different respiratory impairment assessment criteria are prevailing. Like GOLD and LMS.

We have attempted to study respiratory variables by computerized spirometry, the ATS (American Thoracic Society) guidelines and adopted in GOLD criteria, because as CA Vaz Fragaso et al.[35] have mentioned that "Spiro metric reference values for the LMS method are currently unavailable for non-white and those aged >80 years." by quoting two references.

Our method of assessing Spiro metric values and hence criteria we followed for COPD, in line of Global Initiative method; by which, variable of FVC1/FVC as 73.3. % in male participants and about 68% in female participants as shown in tables are assessed.

According to those norms, Mild or Stage I, is FEV1/FVC< 70 %, but FEV1>/=80 % predicted. Accordingly in our cases , of females, 68.8 % FVC1/FVC and FVC>/= 80% is there, suggesting stage I COPD [mild] in female population, of

aging participants by this criteria. In male participants also at degree of reduction in FEV1/FVC is seen (vide graph).

Quoting Hardie JA, Christopher Dyer [40] has clarified that FVC decline with age occurs later than FEV1 and at slower rate, and hence, “There is natural fall in FVC1/VC from about 75 to 70 % by age of 70 years.” This would incorrectly diagnose such older people as COPD cases.

Also, Harris R.S. and Lawson T. V. [41] have mentioned that “the total expired air and sustained air flow are more important than the peak air flow alone in assessing the effectiveness of cough”, whereas, J.A. Smith et al. [42], have mentioned that “there is a predictable relationship between cough peak flow and number of cough re-acceleration produced within a cough epoch.” As such, we have assessed the expiration function by peak expiratory flow meter. It is well known that the elderly population often has cough clearance issues which in this way make the respiratory assessment meaningful.

Future Scope and Perspectives in Aging Problems:

The world has at present a large number of aging individuals; and their problems are varied and many.

Unfortunately the animal models for aging experiments are not successful in providing appropriate answer to issues of human beings as their structure, function, biological behavior, and molecular mechanisms are not exactly parallel to human beings, and hence the research about aging has to be done essentially in human beings only, where the ethical and many problems are inherent, including ethnic, life style issues and issues related to psychosocial and genetic issues. This indicates that the

research in aging is not only a challenging work but also a time consuming and expensive work particularly when it is a longitudinal study, with different unpredictable issues like drop outs, changes in diagnostic and assessment technology etc.

It is observed that India is a country with a very large number of young population, but sooner in coming 25 years changes of senility and decline of physical and mental functions and consequent issues of large number of economic, psycho-social, may complicate the fabric of national progress and arouse newer and multiple challenges. The health service sector, human resource sector and finance sector should venture timely to fore see and exercise adequate measures to handle these issues and its congeners successfully.

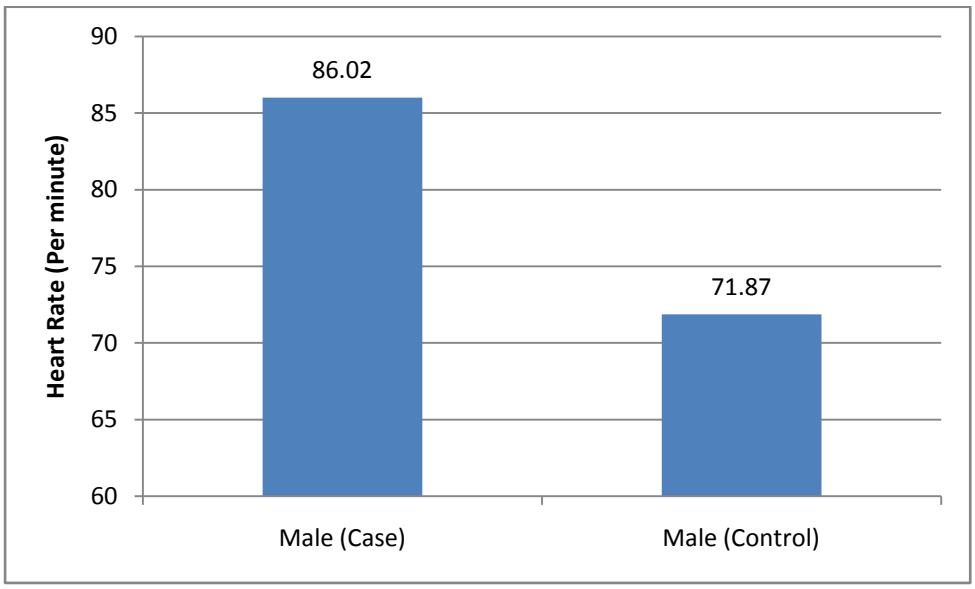
From medical point of view, if the research by Animal model is not rewarding lately, attempt have been made to resolve the issues by creating a mathematical physiology model to answer some pertinent queries. Such research papers like in rat cadio-myocyte assessment by mathematical physiology have already been seen in research journals of medical science.

TABLE 6 : ANALYSIS – FEMALE CASE[n=50] & CONTROL[n=15]

CVS AND RESPIRATORY SYSTEM PARAMETERS

Variable	Female (Case)[n=50]	Female (Control)[n=15]
HR[beats/min.]	85.78	73.53
SBP[mm. of Hg.]	135.82	117.6
DBP[mm.of Hg.]	81.08	77.33
SPo2%	97.7	97.87
P wave[ms]	103.34	105.87
QRS[ms]	97.8	107.73
PQ[ms]	160.5	141.33
QT[ms]	385.28	403.33
QTc[ms]	434.42	387.87
QT/QTc[ms]	88.7	96.13
QT/RR[ms]	21.94	40.27
Axis-P	27.58	17.53
Axis-QRS	19.78	59.07
Axis-T	43.44	54.07
FVC	2.32	4.8
FVC M PRED	2.58	4.8
FVC % PRED	108.9	99.73
FEV1	1.64	3.93
FEV1 M PRED	1.88	3.87
FEV1 % PRED	110.8	97.07
FEV1/FVC	68.82	80.13
FEV1/FVC M PRED	72.56	75.33
FEV1/FVC%	105 .78	94.33
FEF25-75	2.02	3
FEF25-75 M PRED	3.3	3
FEF25-75 %PRED	98.3	94.87

PERTINANT GRAPHS



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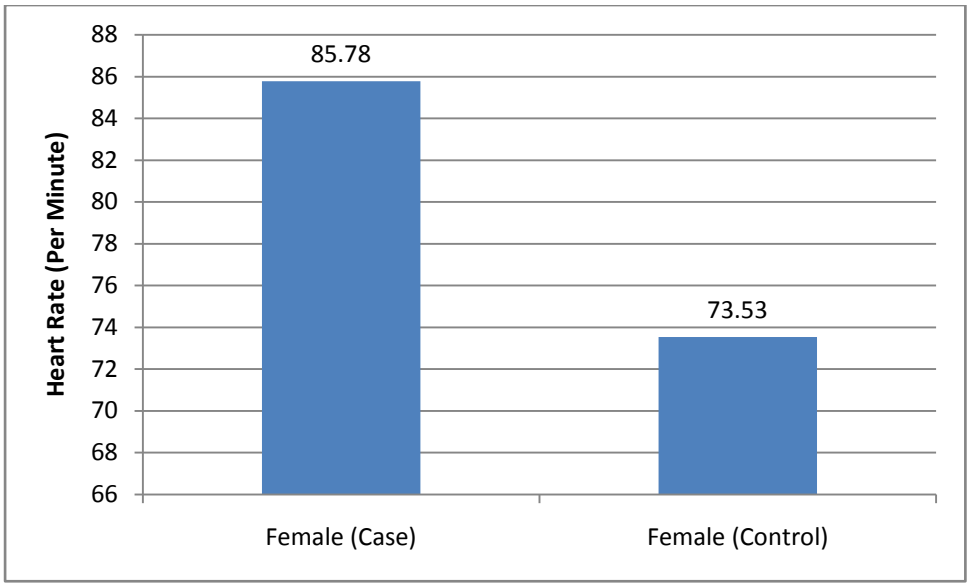

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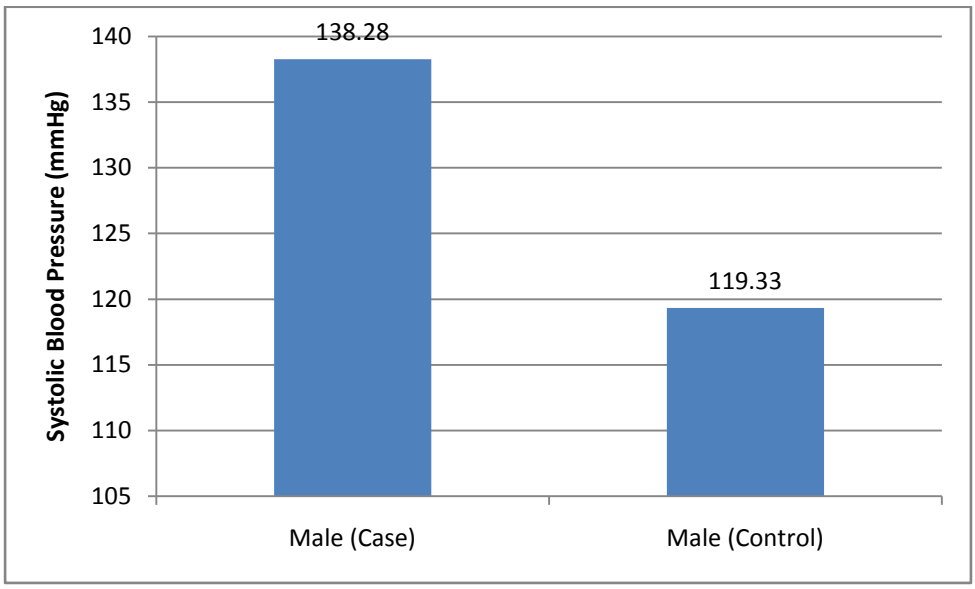

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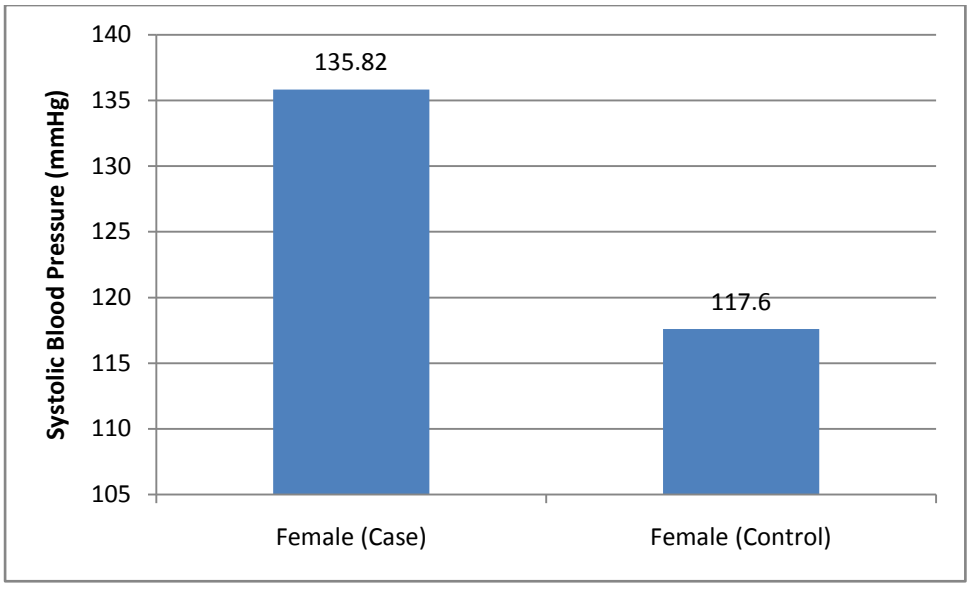

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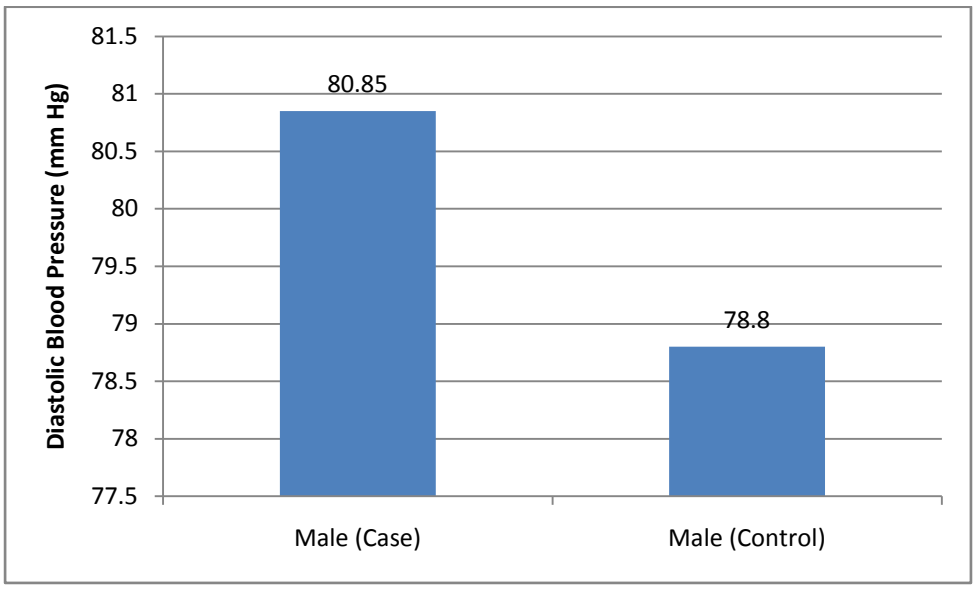

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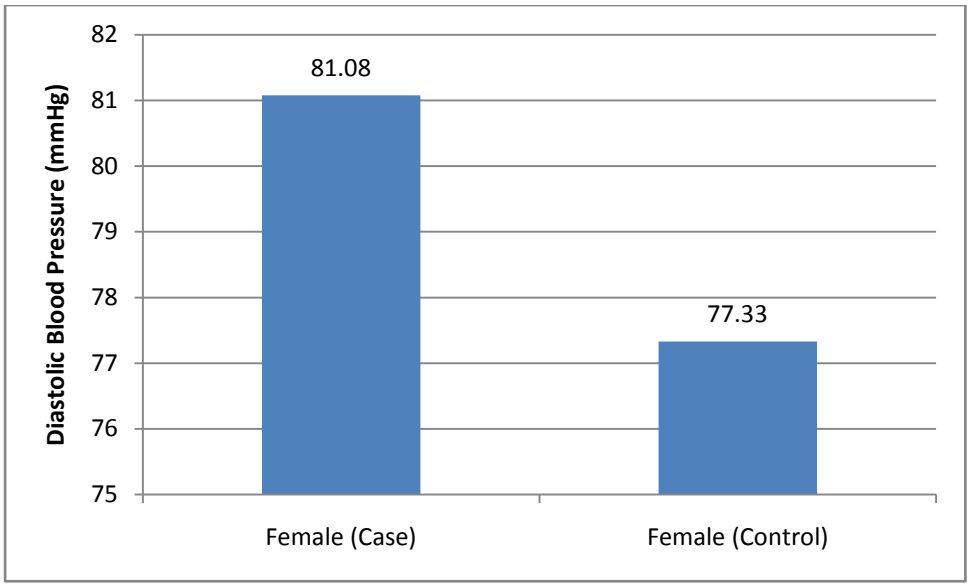

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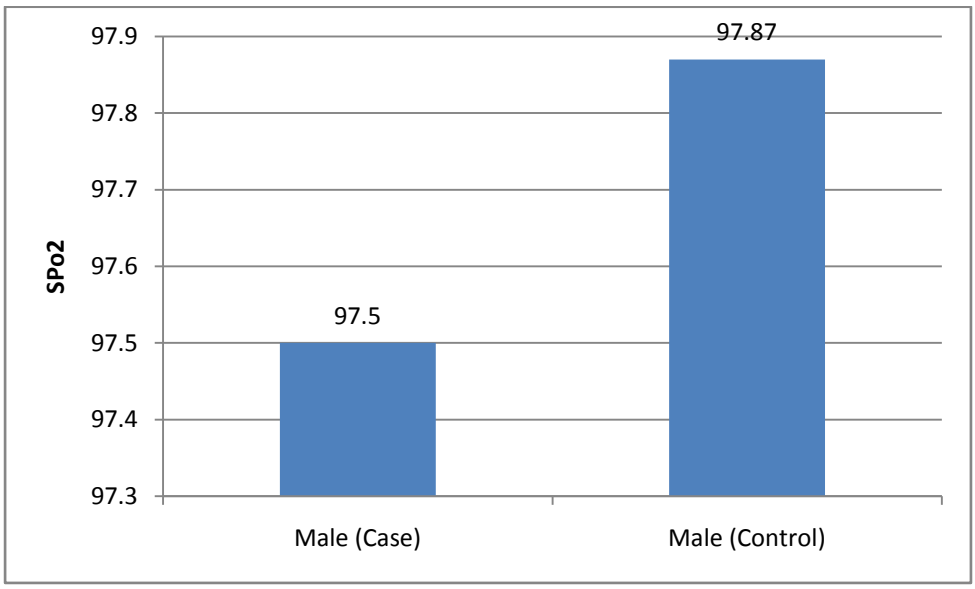

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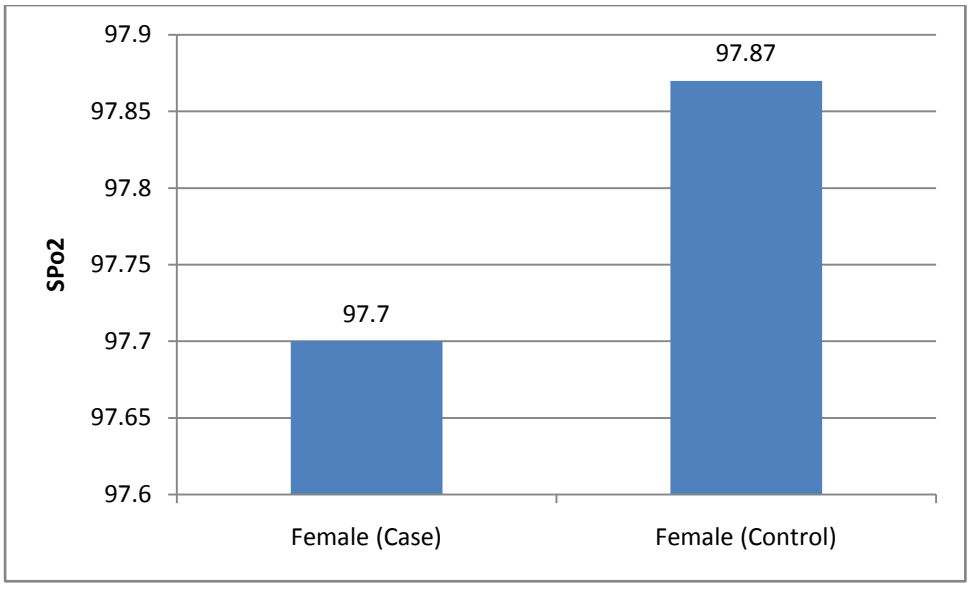

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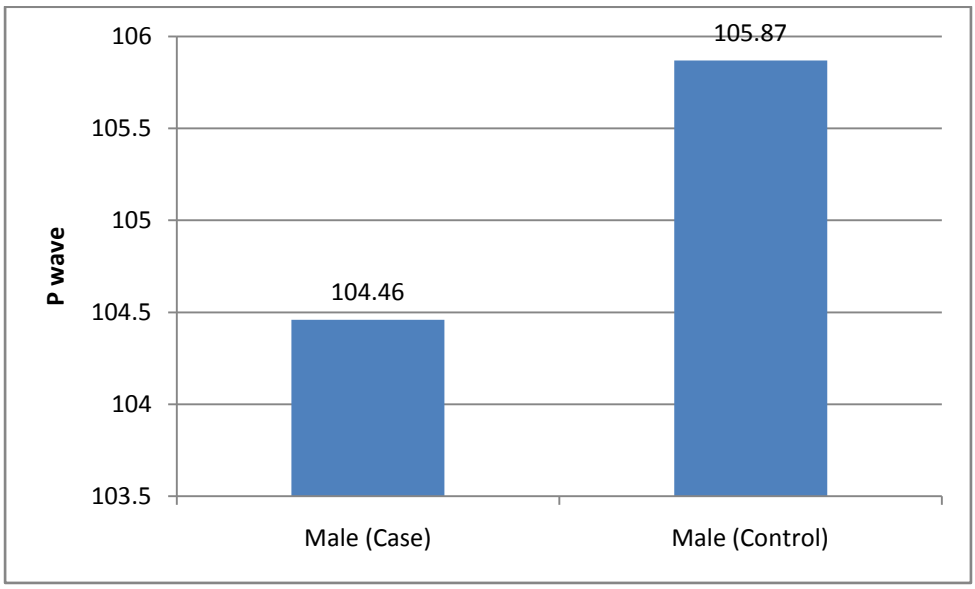

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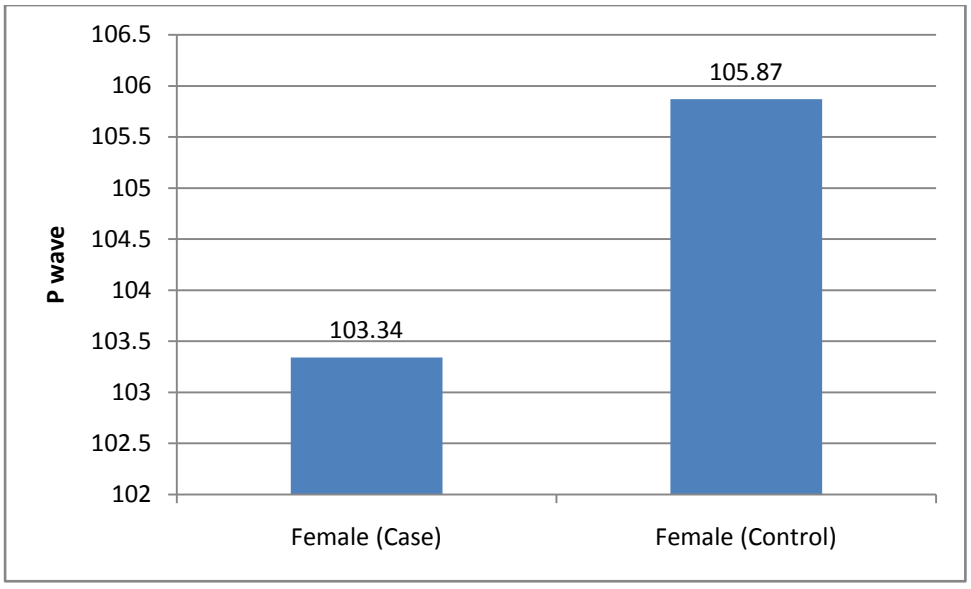

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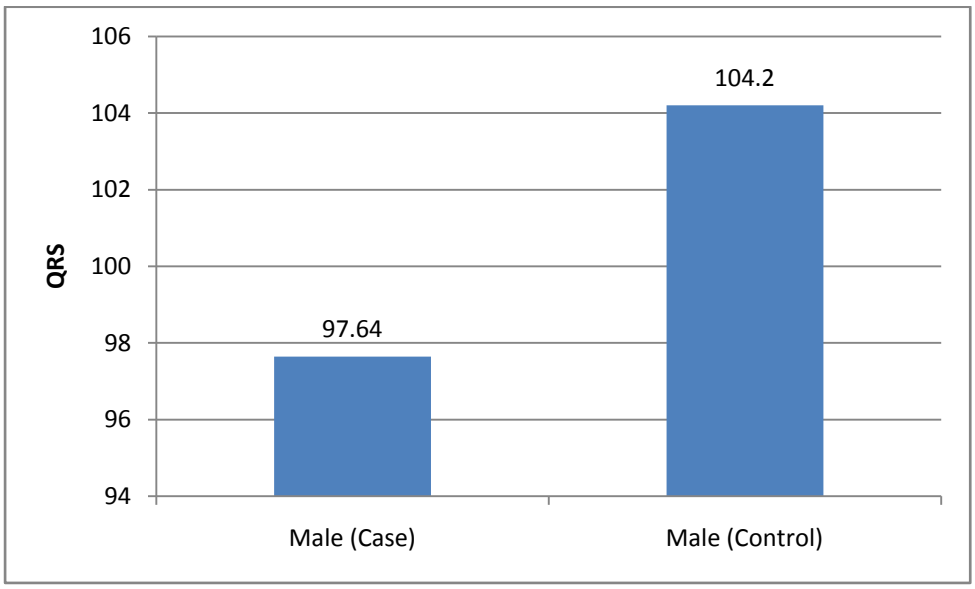

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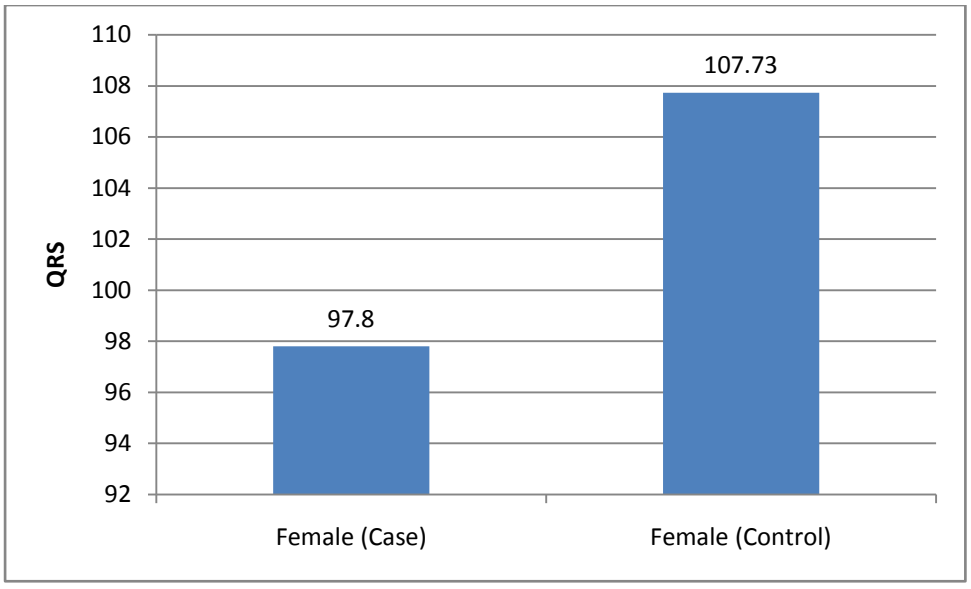

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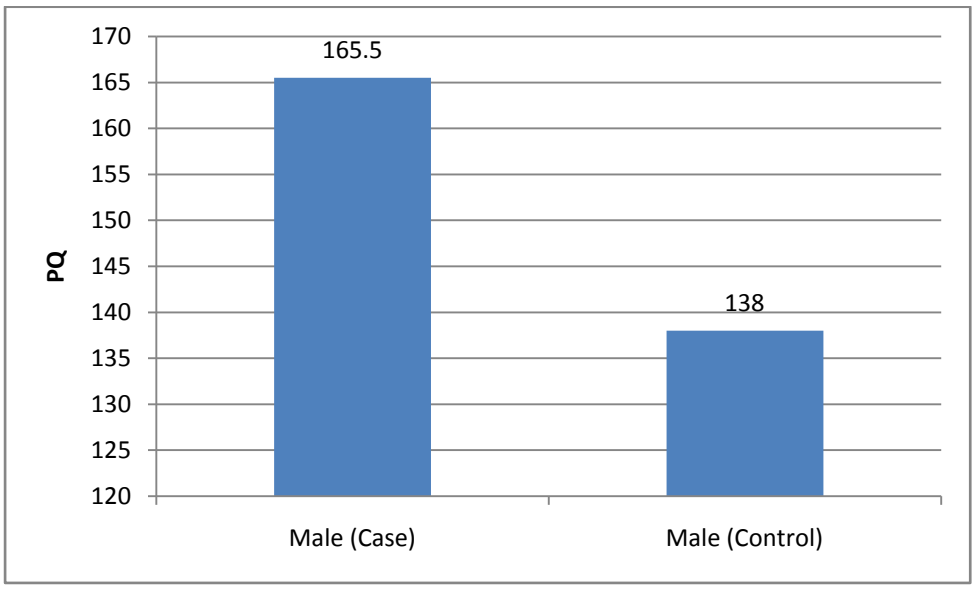

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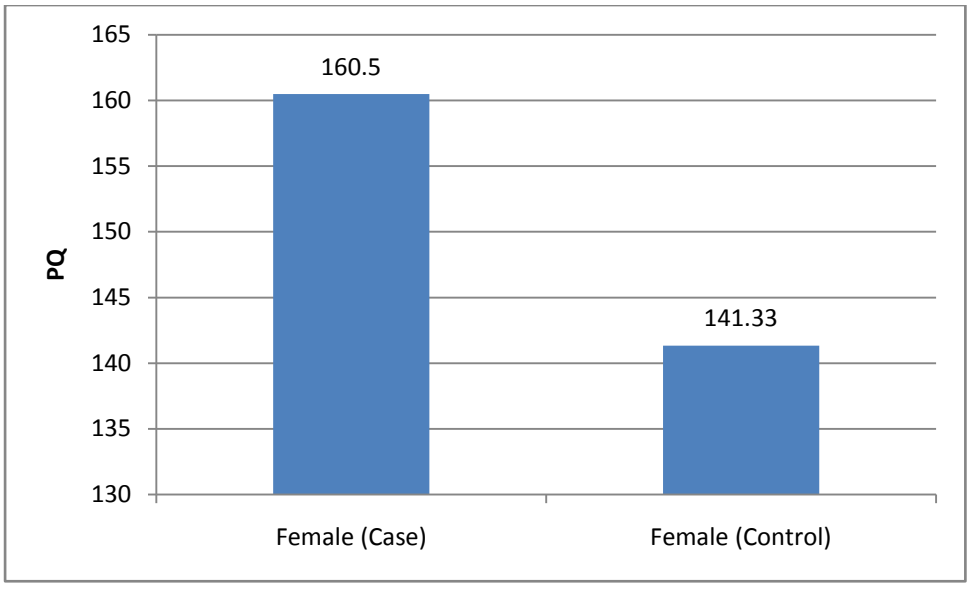

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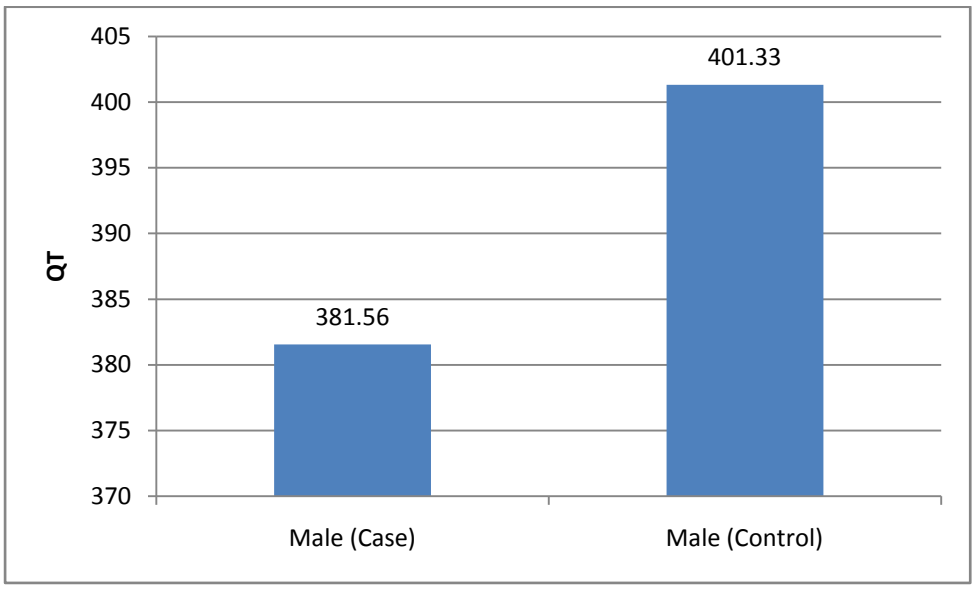

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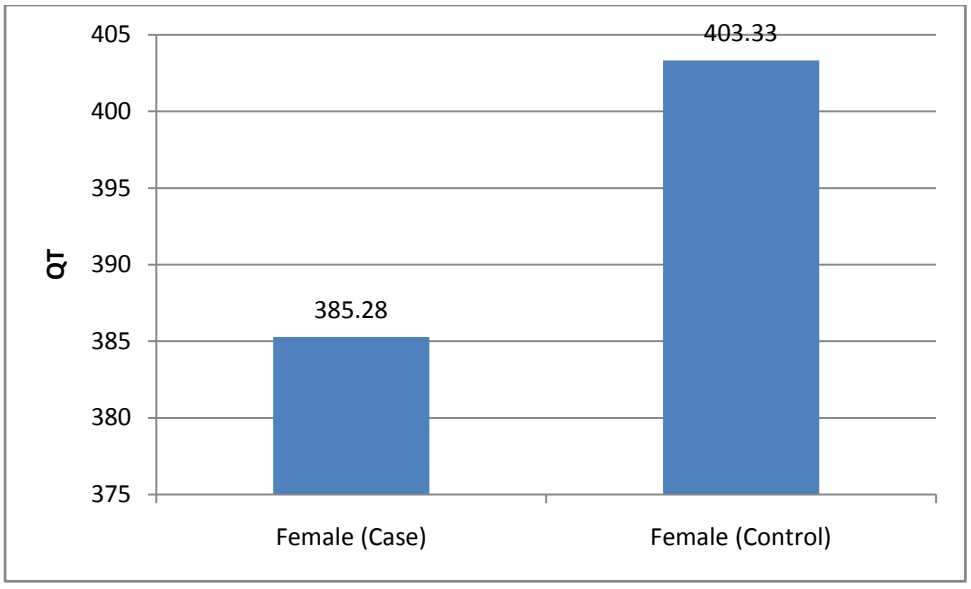

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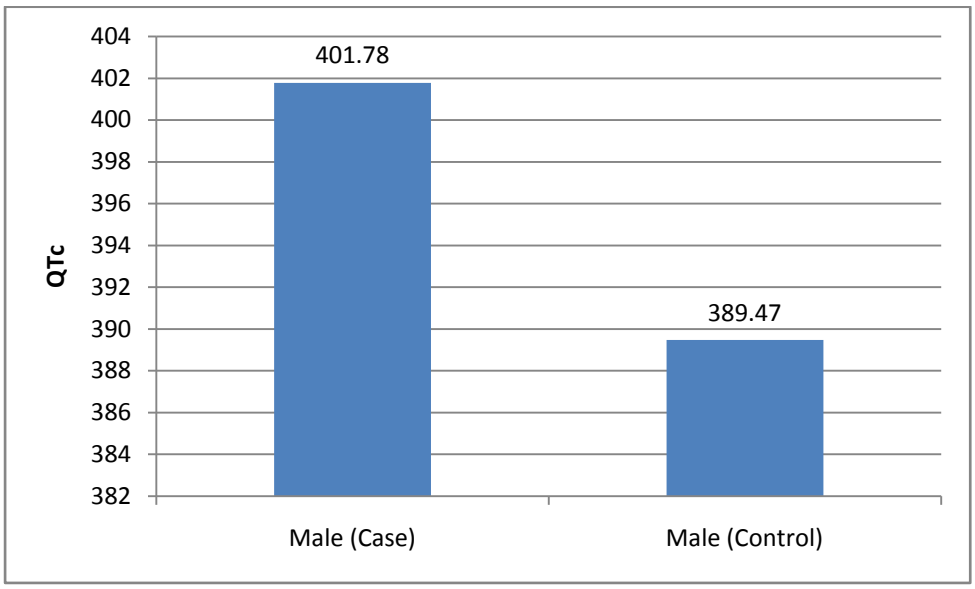

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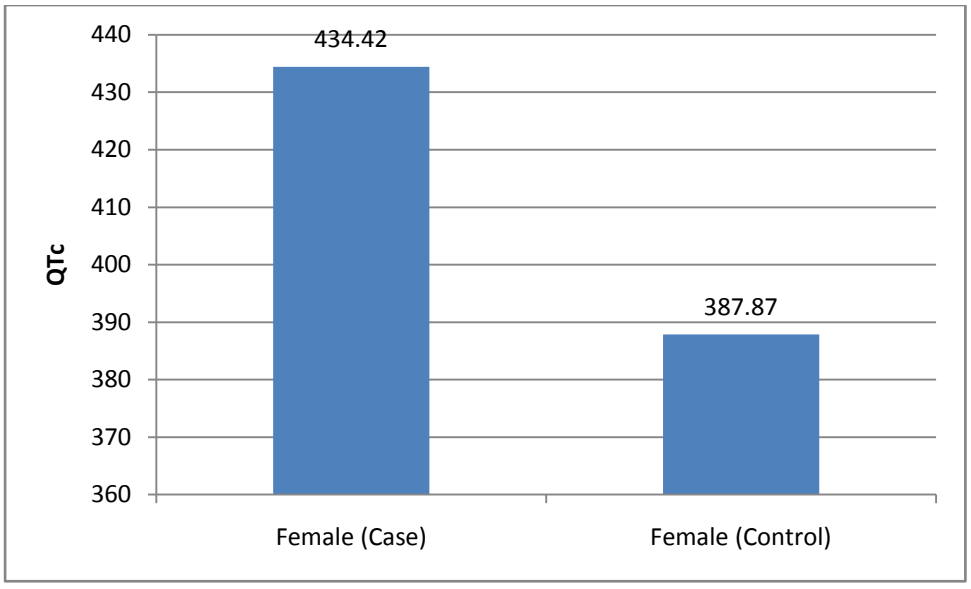

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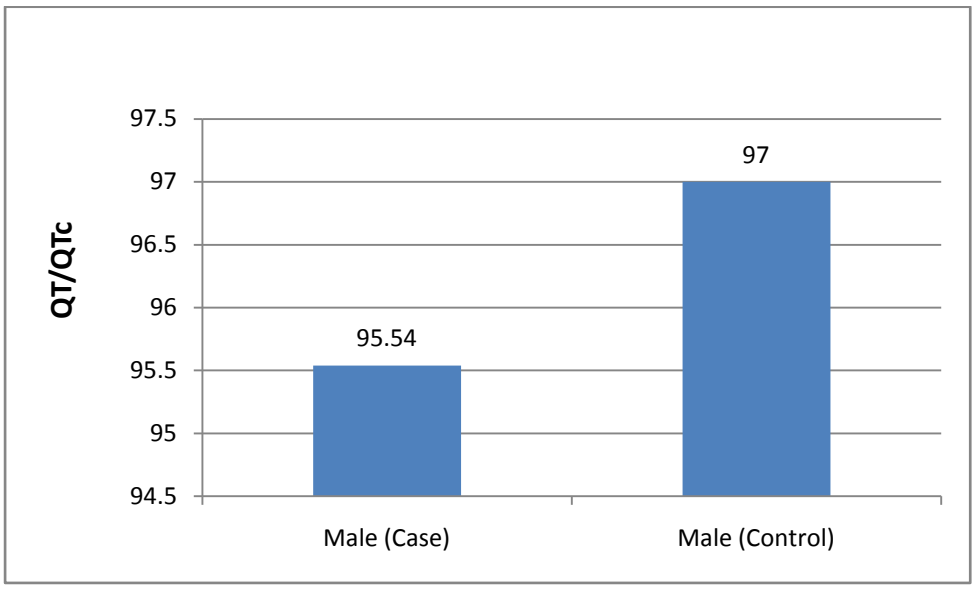

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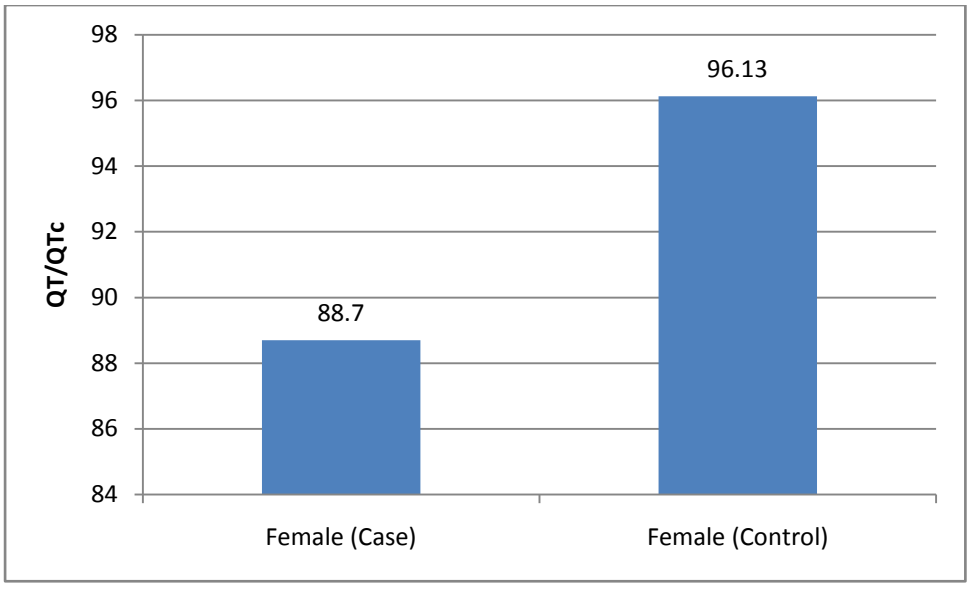

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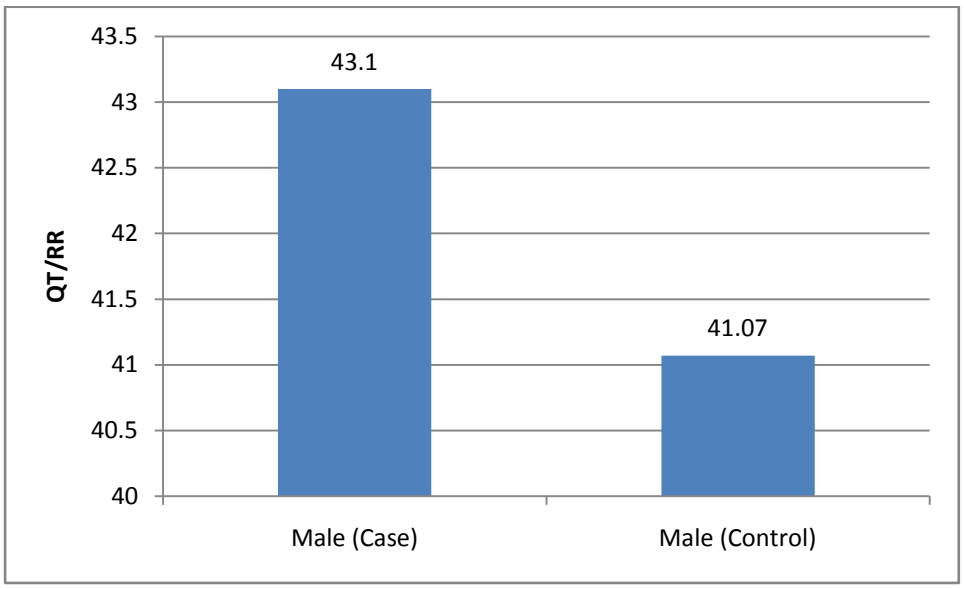

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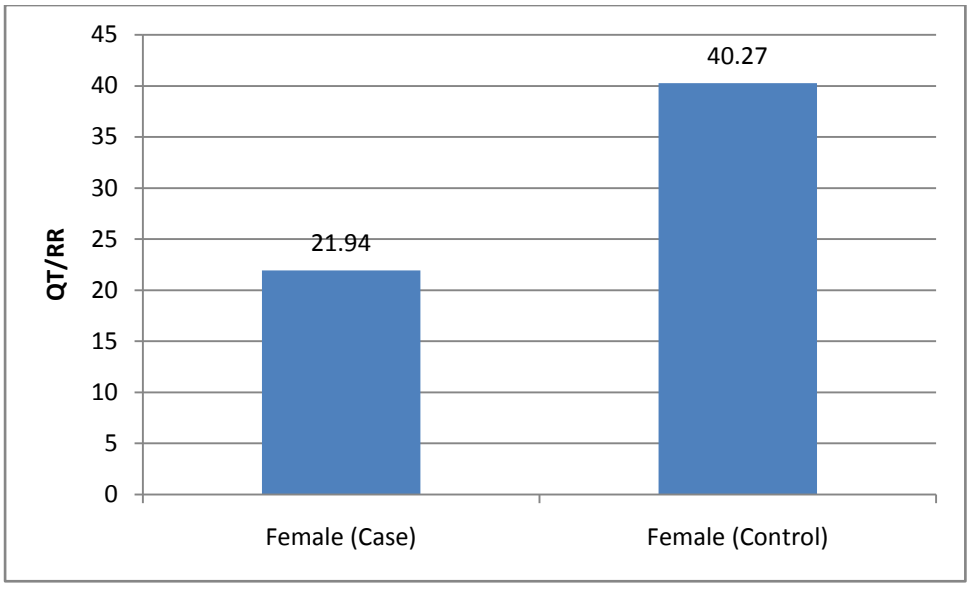

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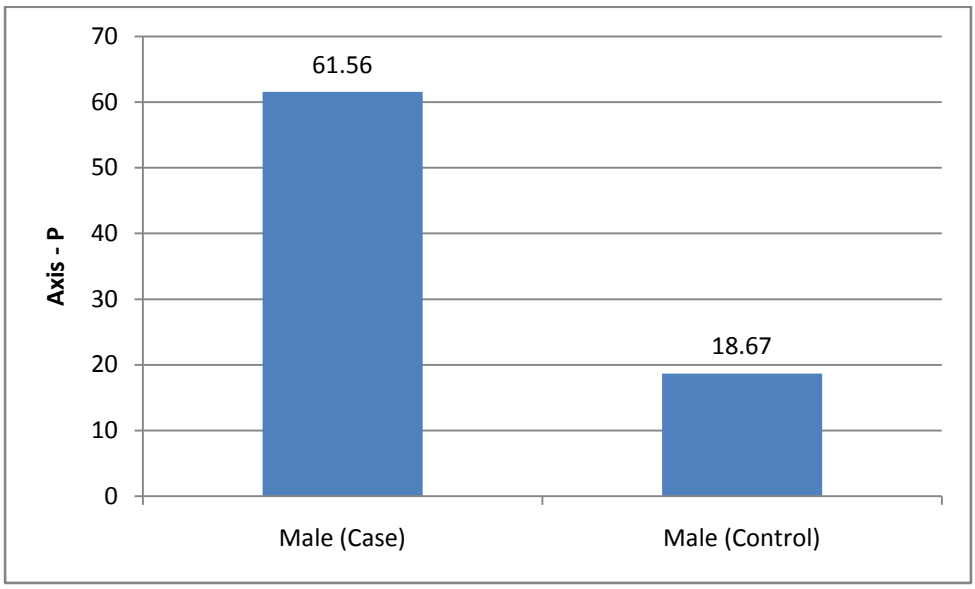

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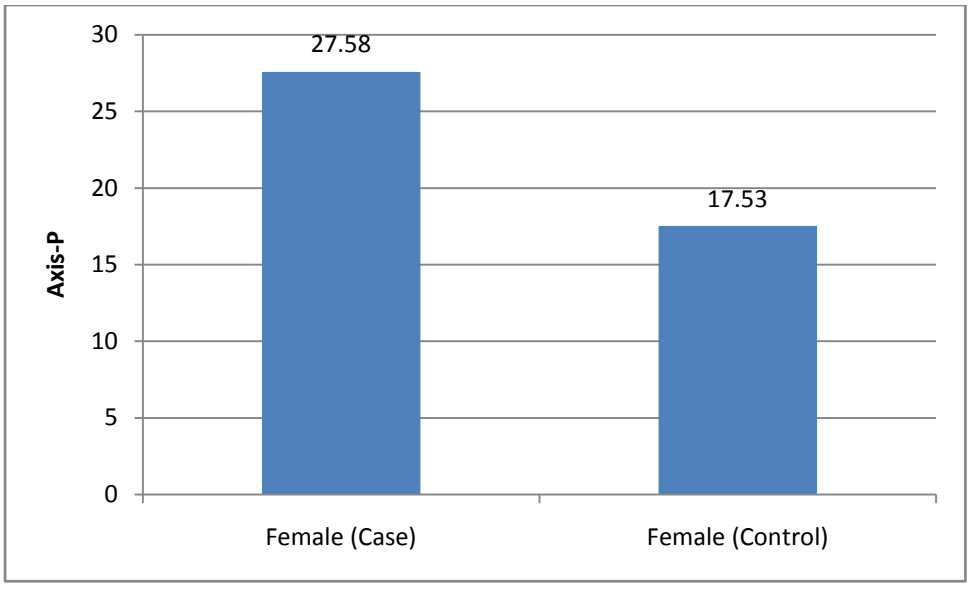

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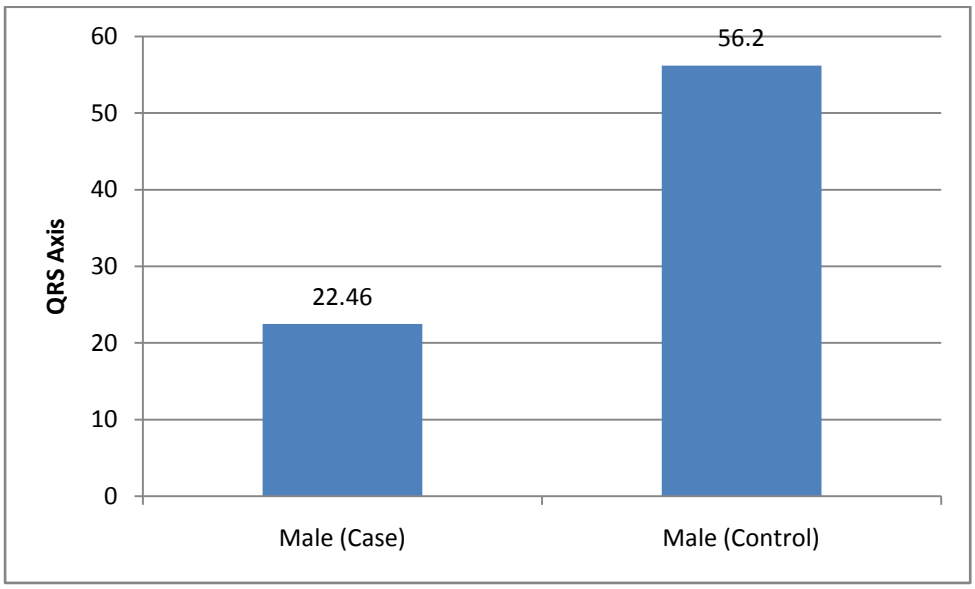

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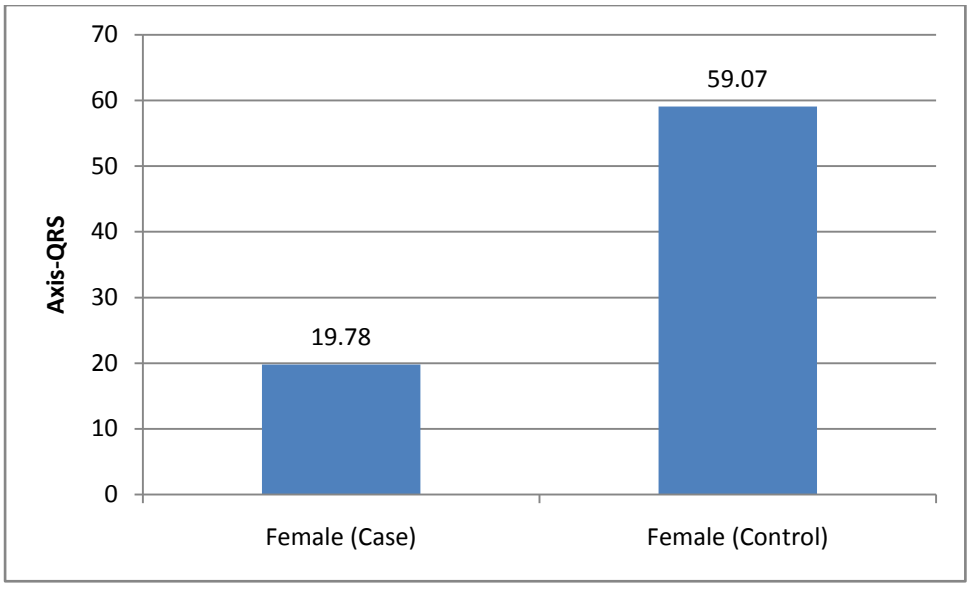

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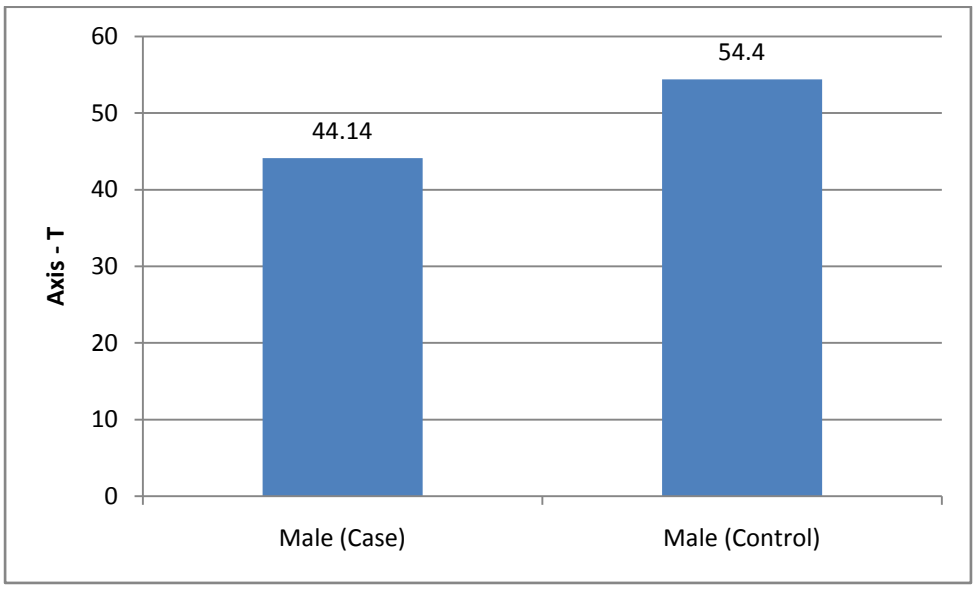

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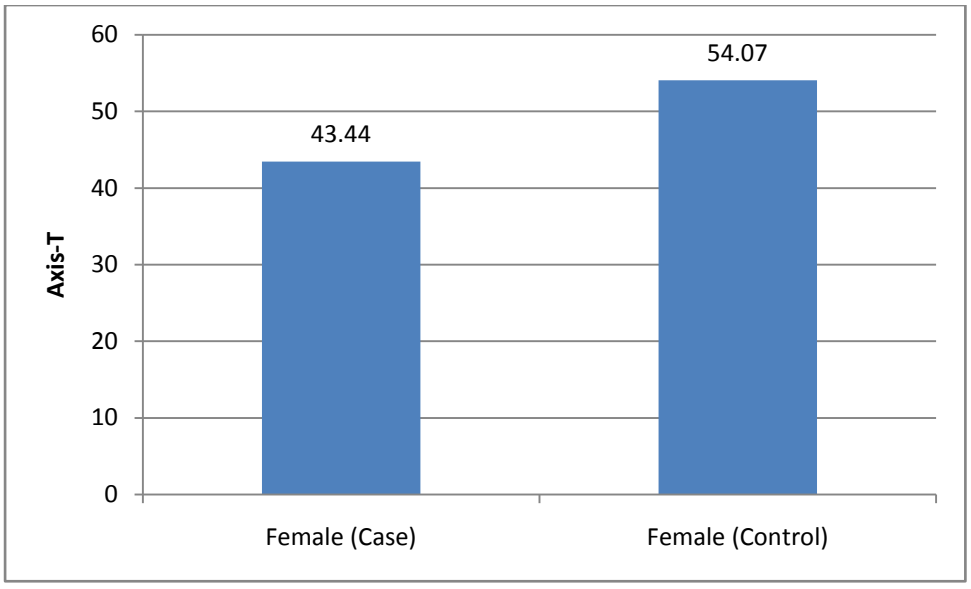

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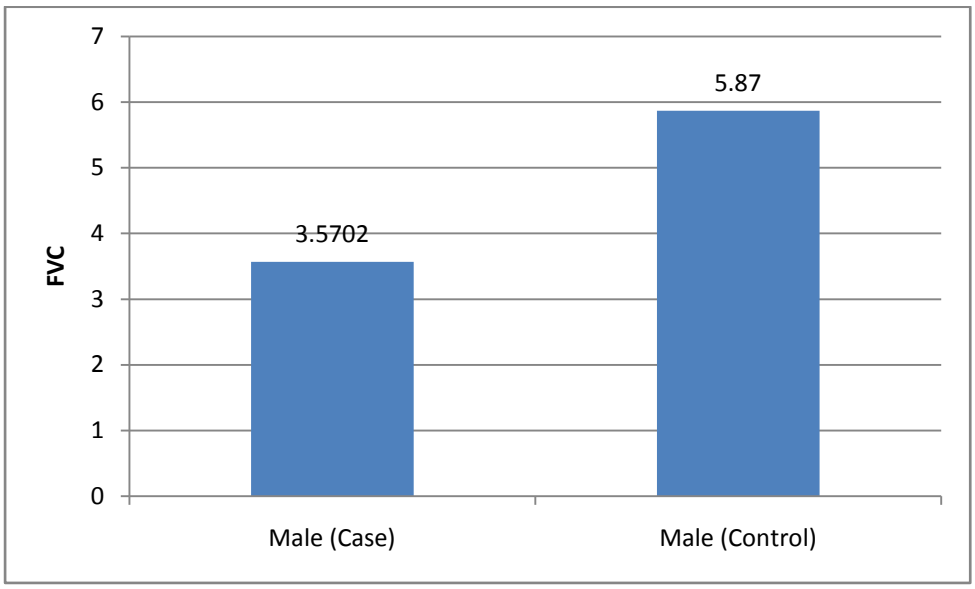

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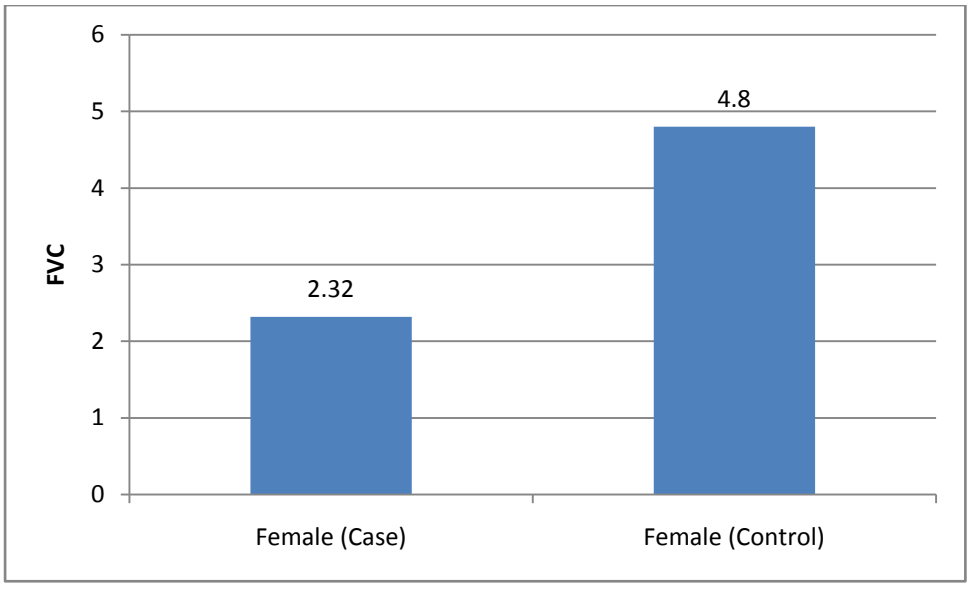

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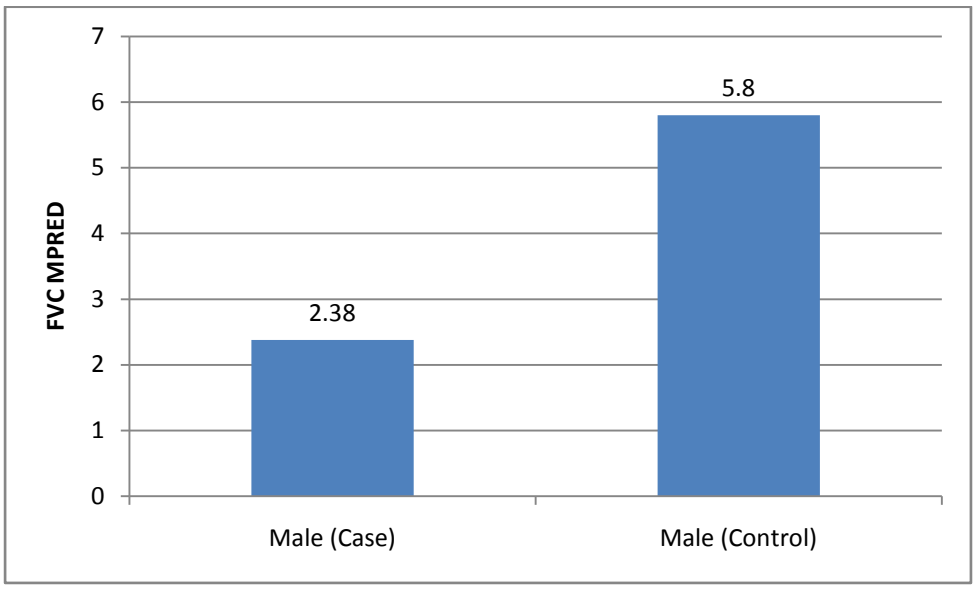

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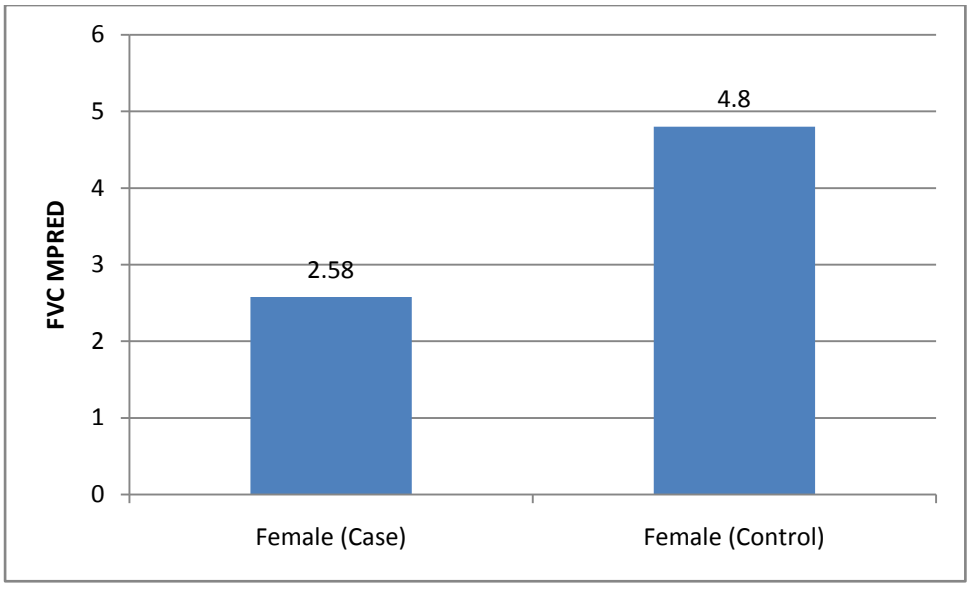
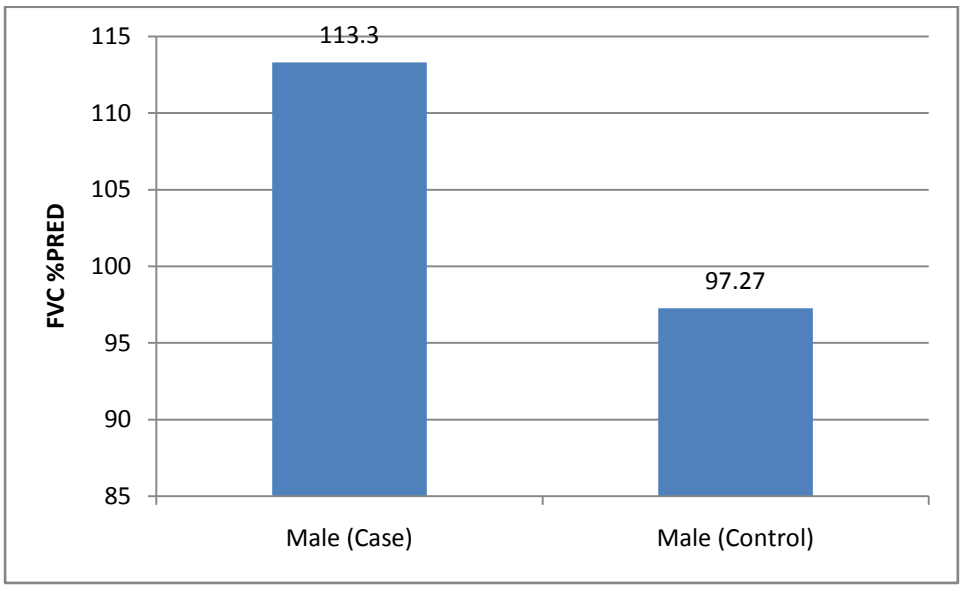


t = 13.8784, df = 63, P value = 0.0001



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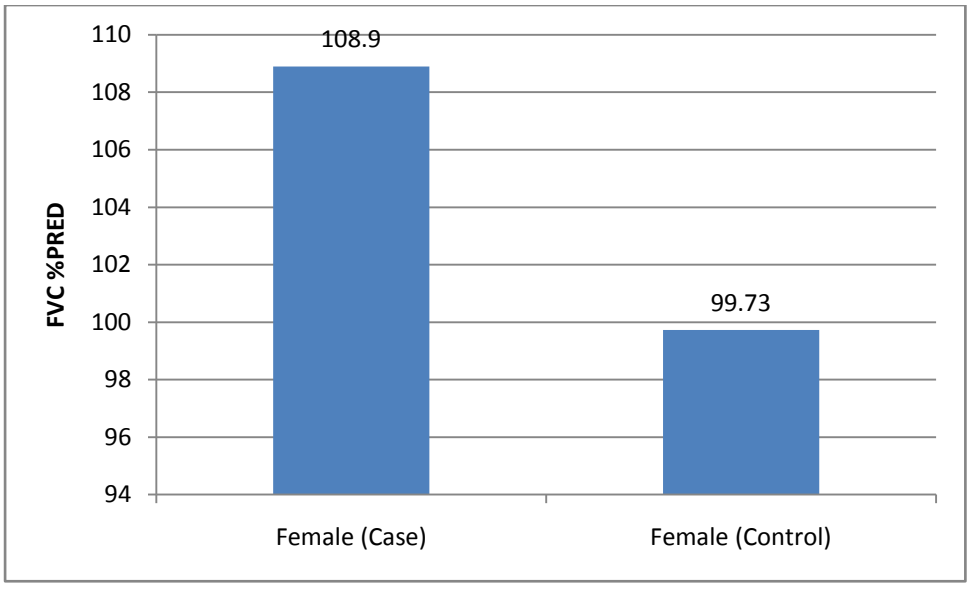
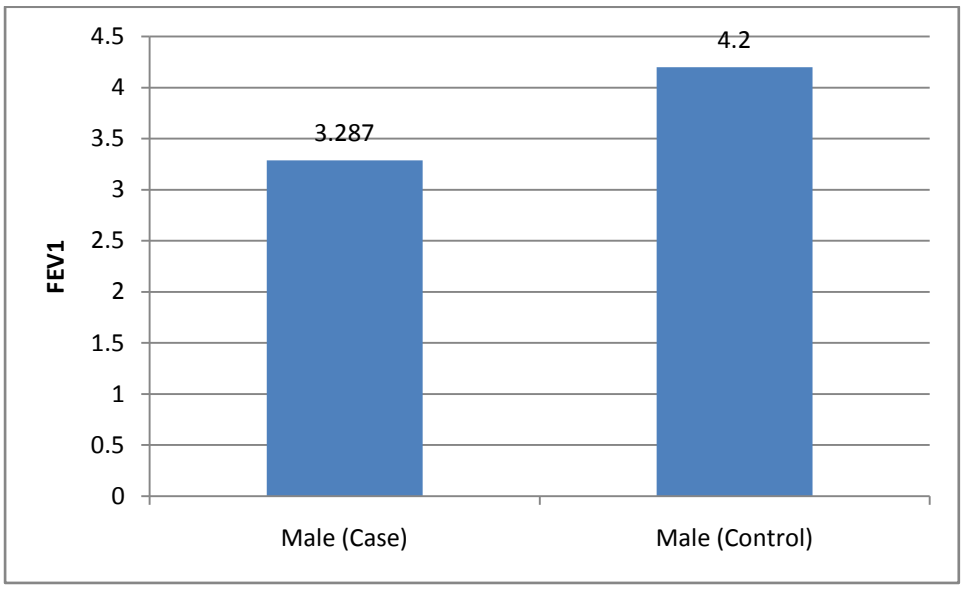


t = 2.570, df = 63, P value = 0.0125



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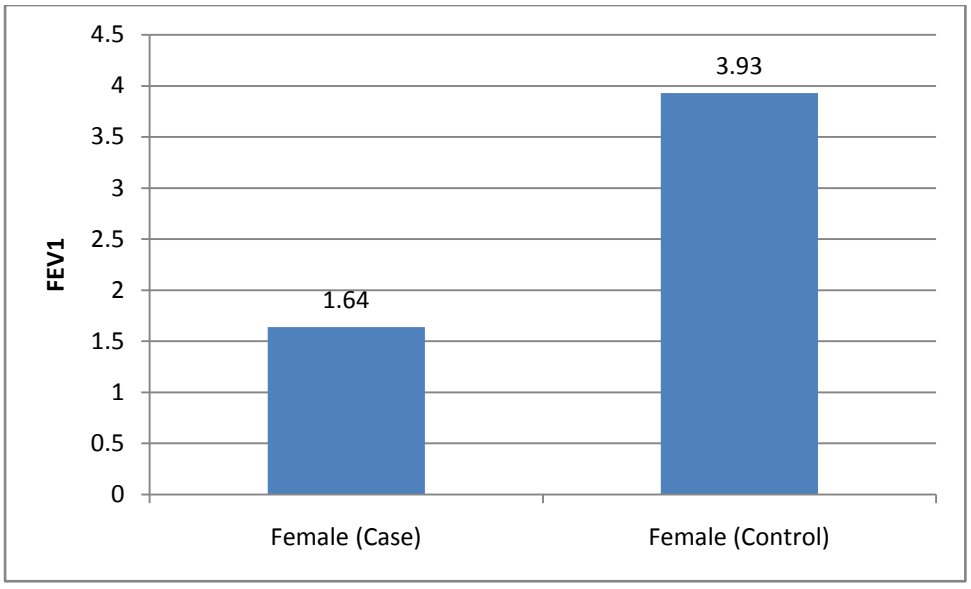
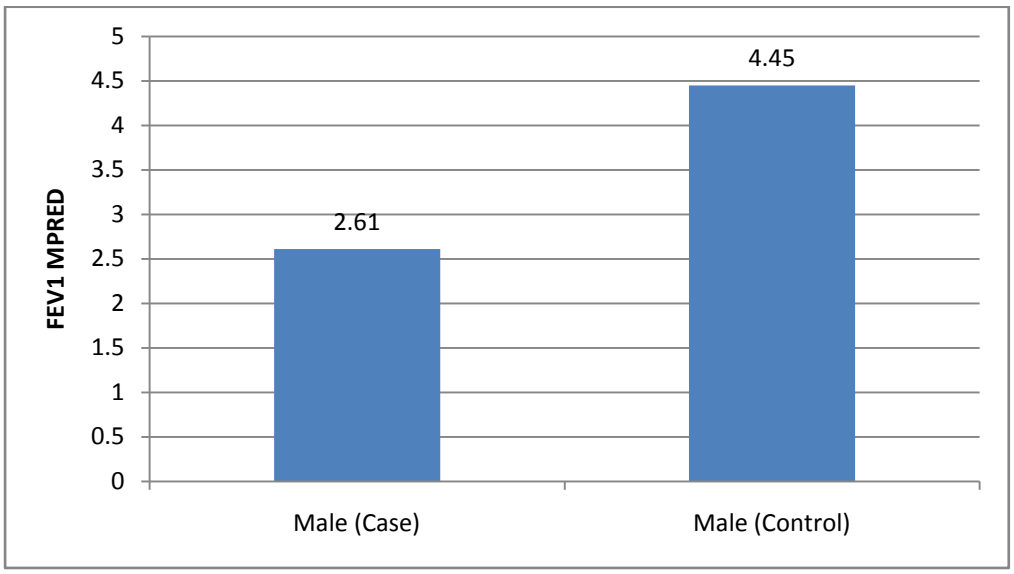


t = 16.2493, df = 63, P value = 0.0001



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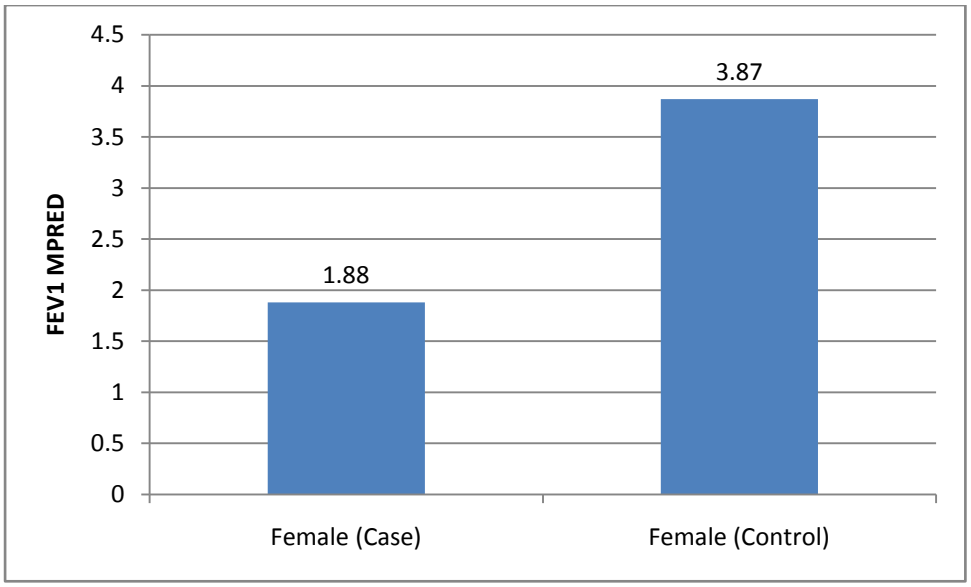

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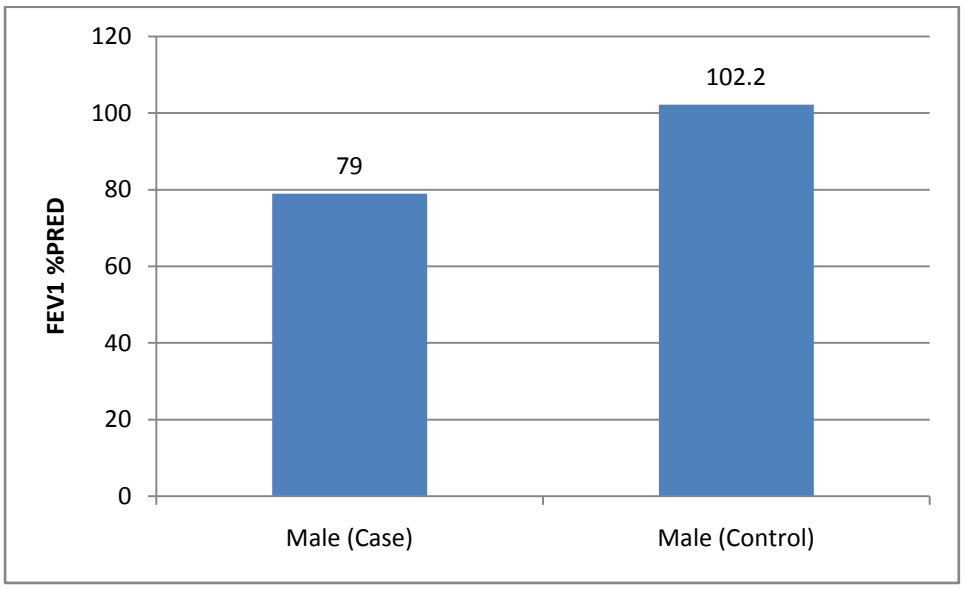

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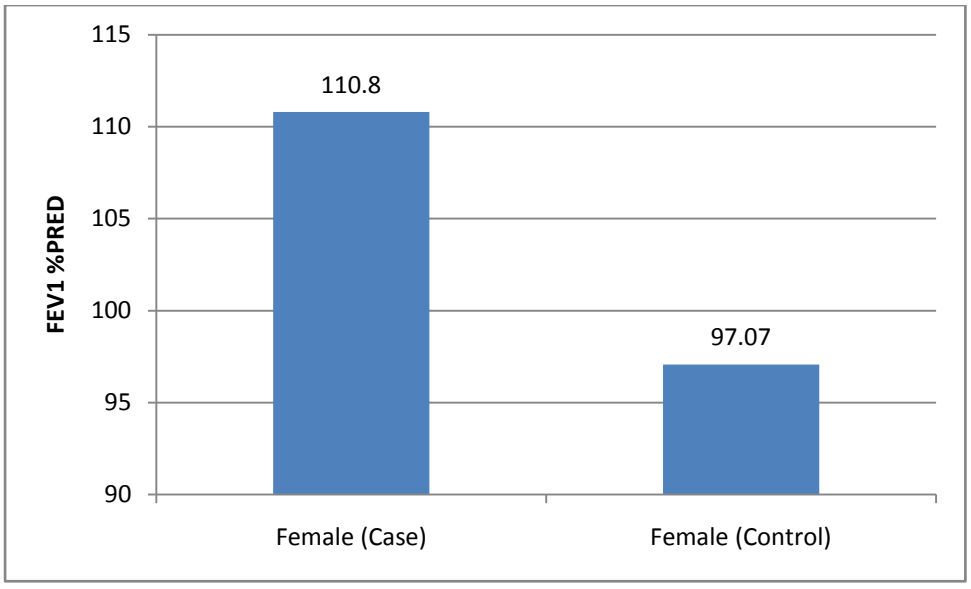

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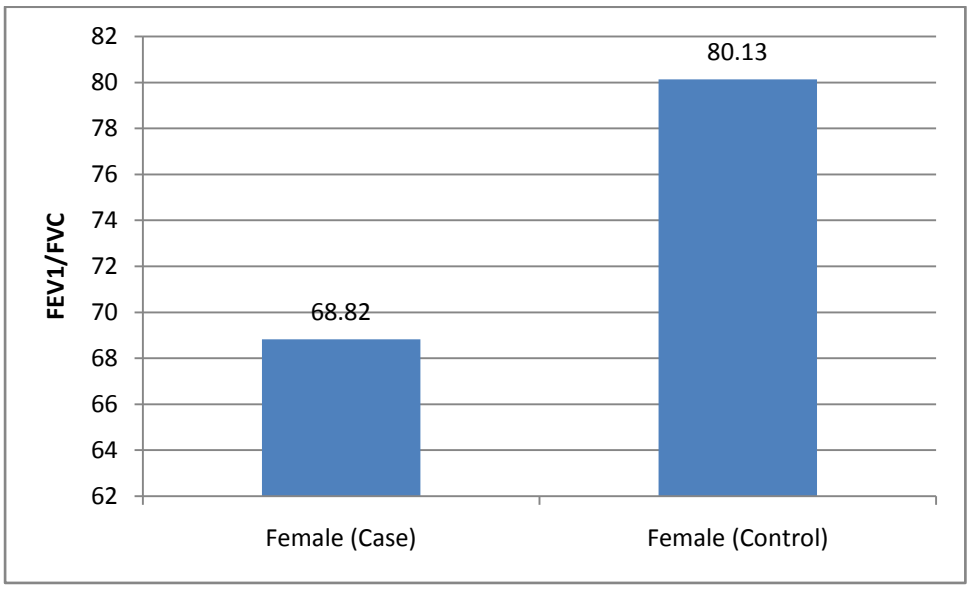
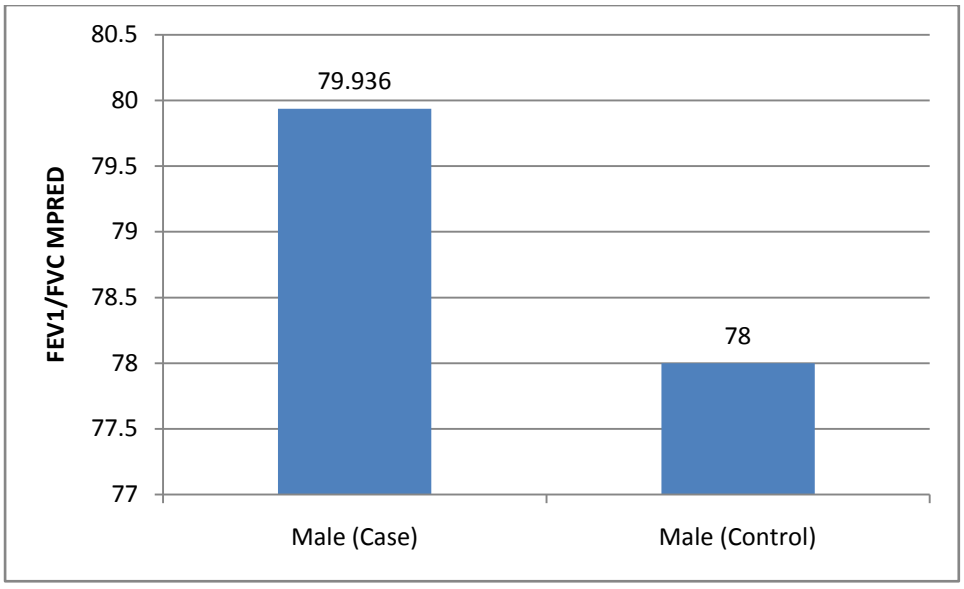


t = 3.8772, df = 63, P Value=0.0003



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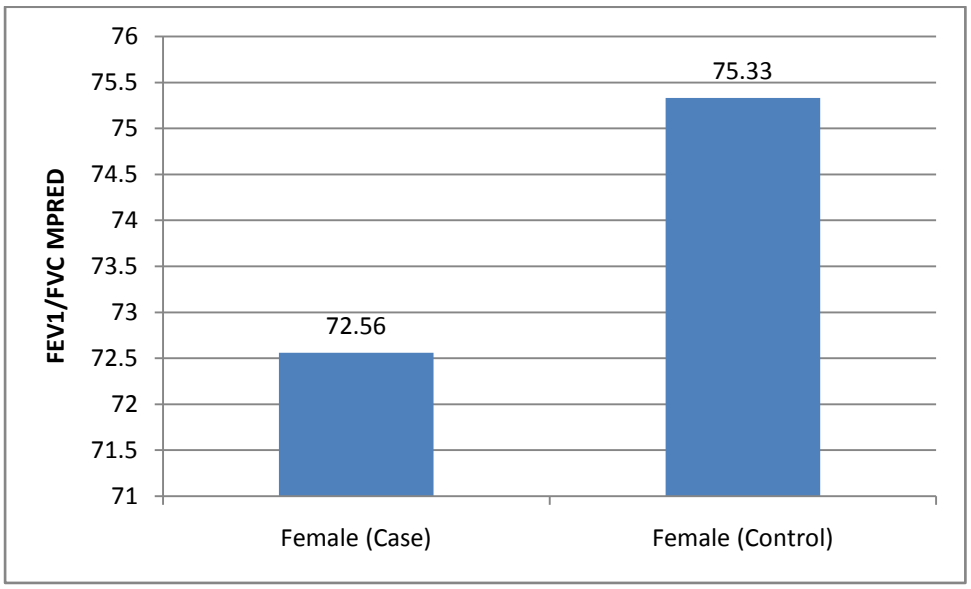
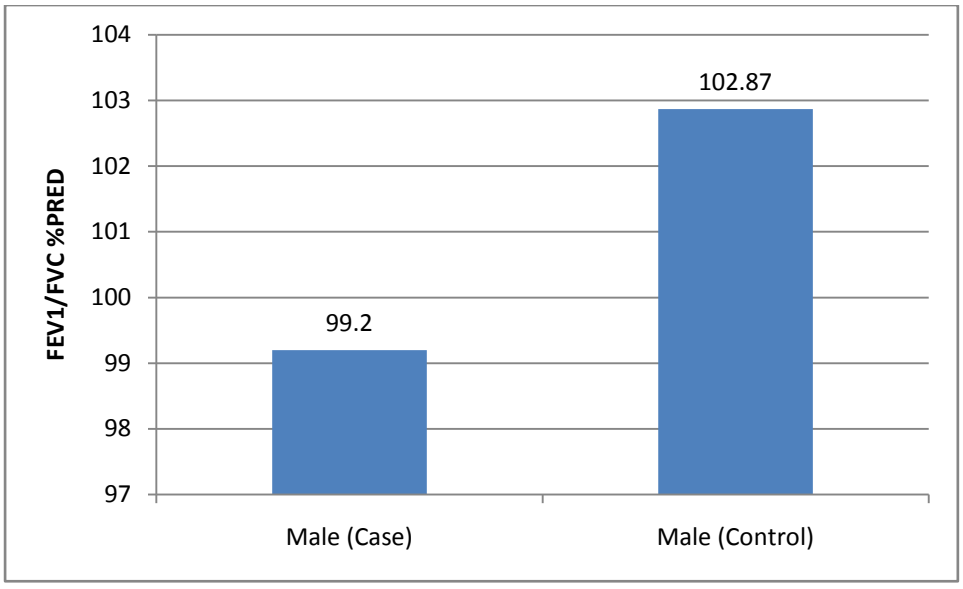
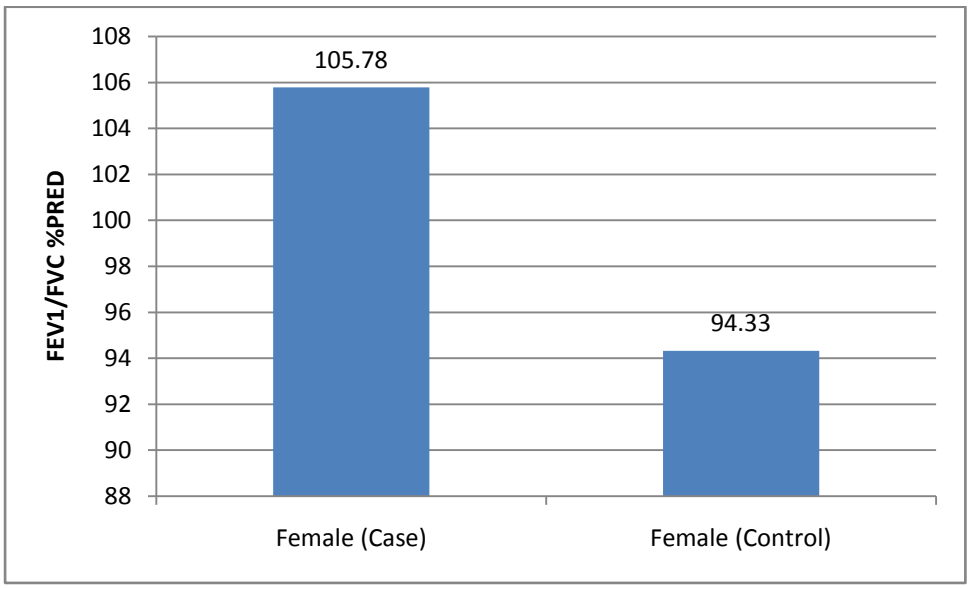


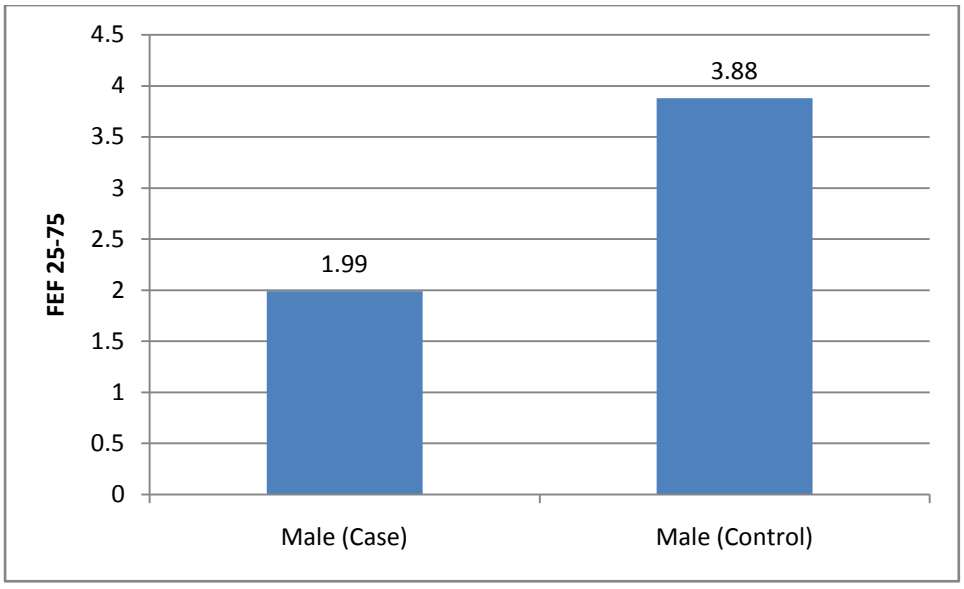
t = 0.9346, df=63, P Value=0.3536



t test =1.0813 , df=63, P Value=0.2837



t = 4.5447, df = 63, P Value= 0.0001



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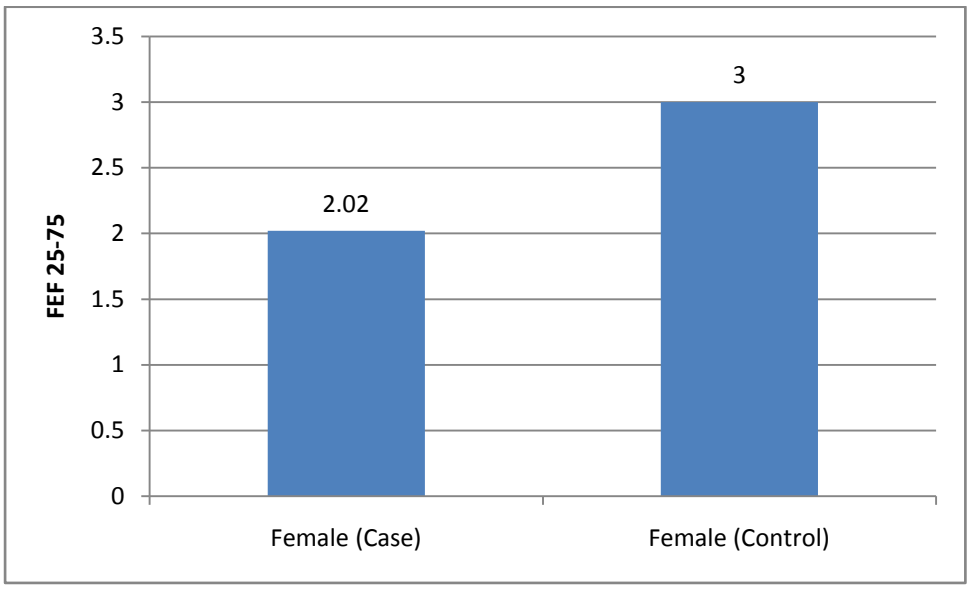

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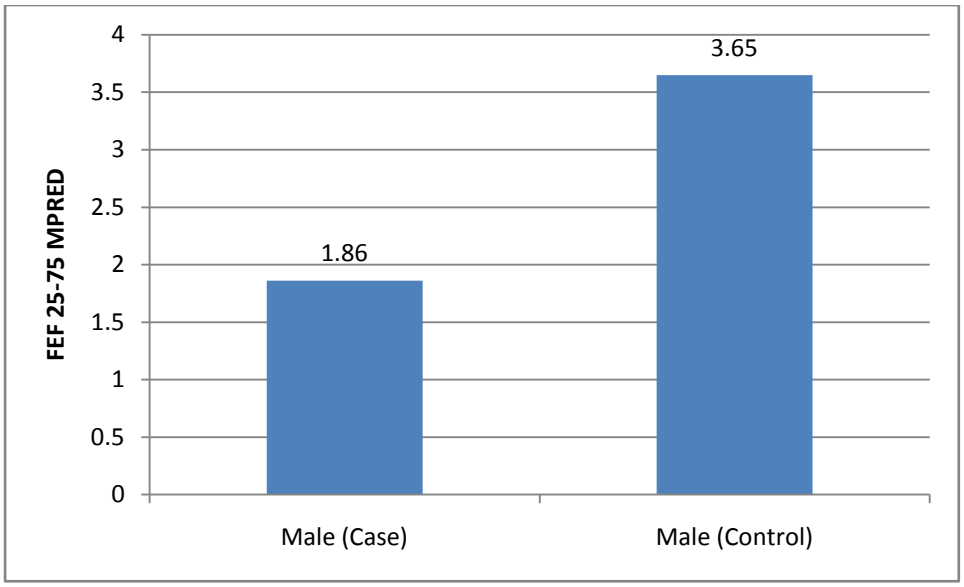
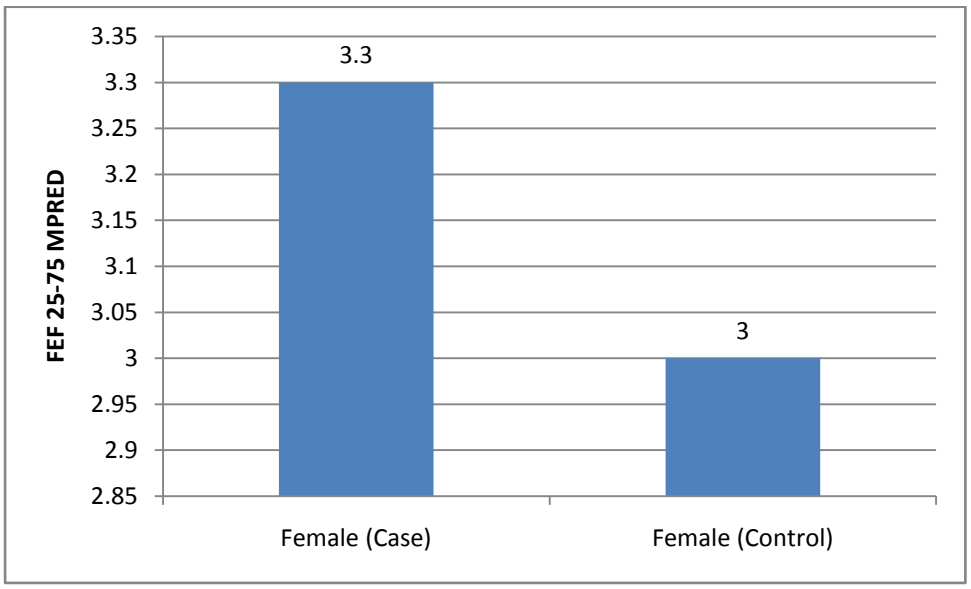


t = 23.5938, df = 63, P Value=0.0001



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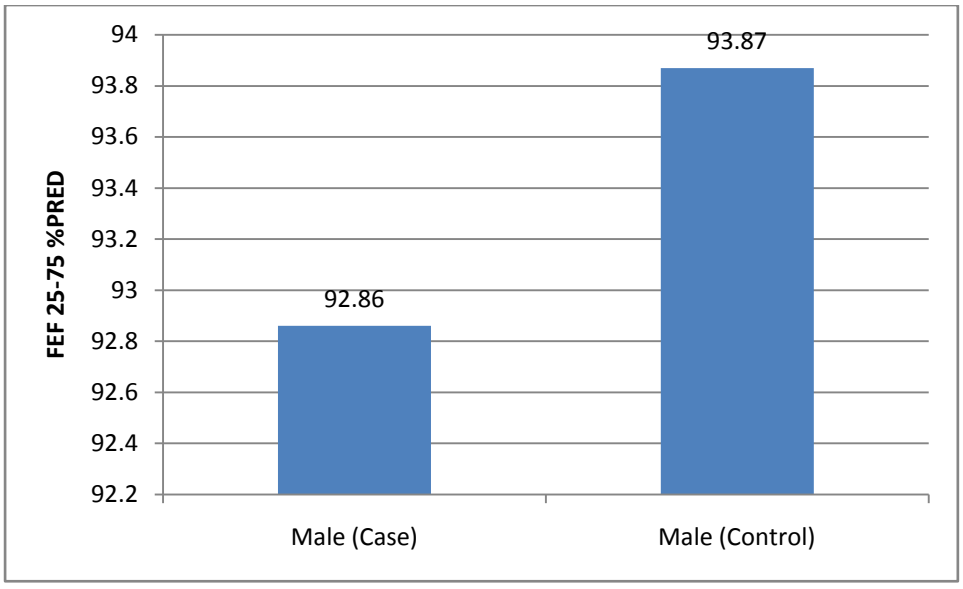

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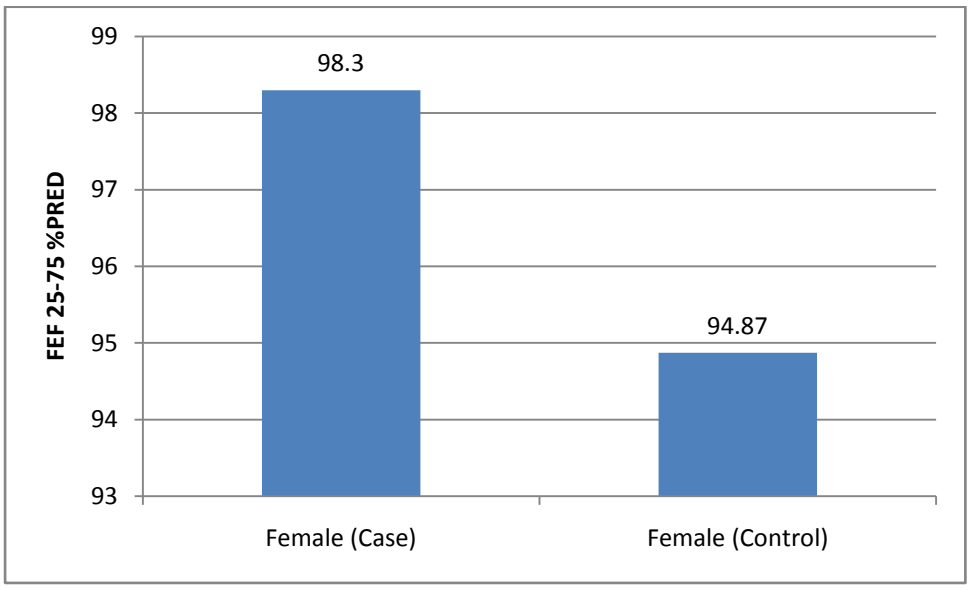
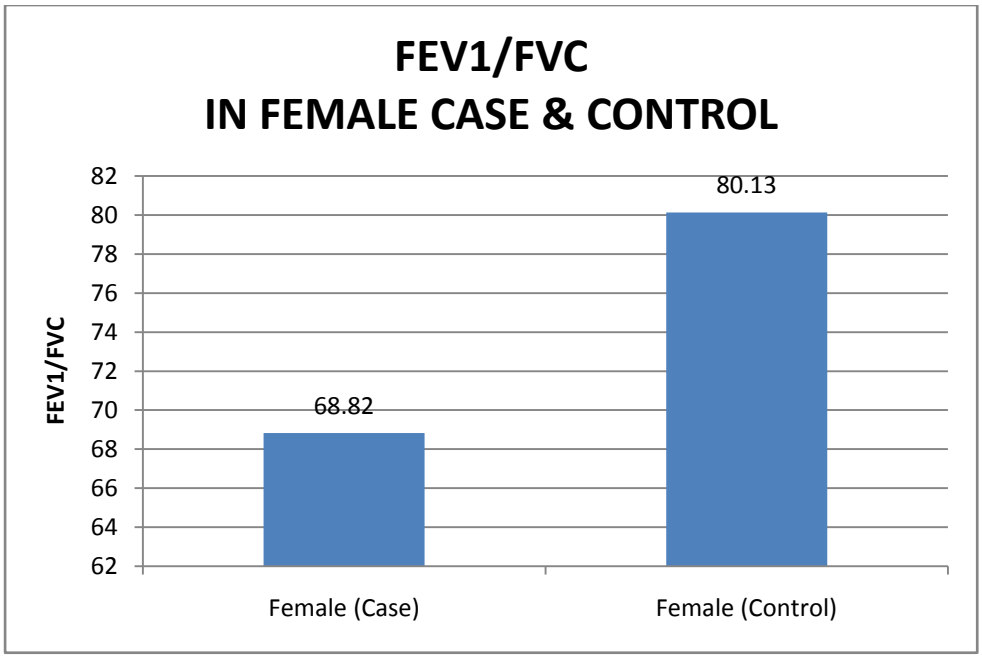
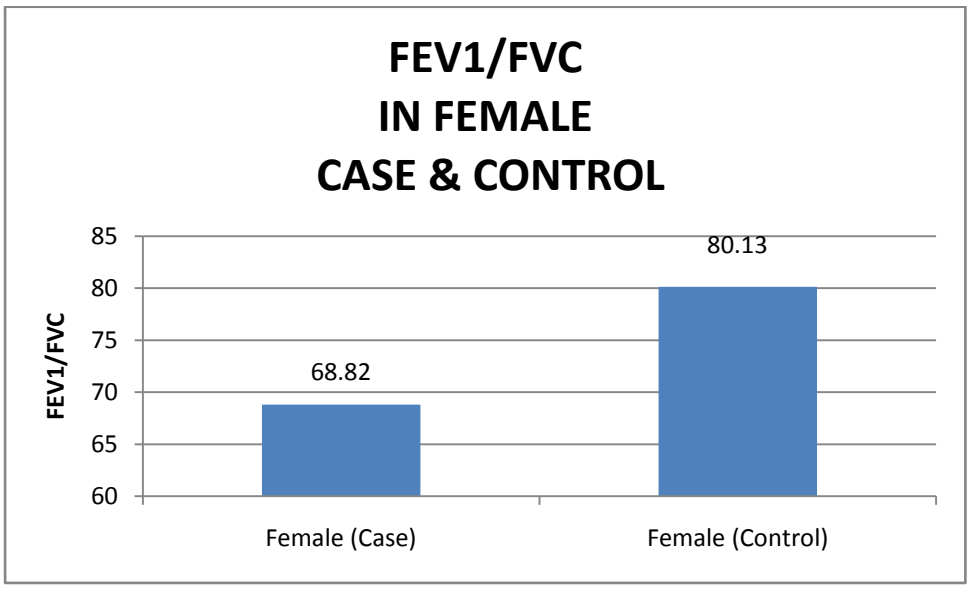
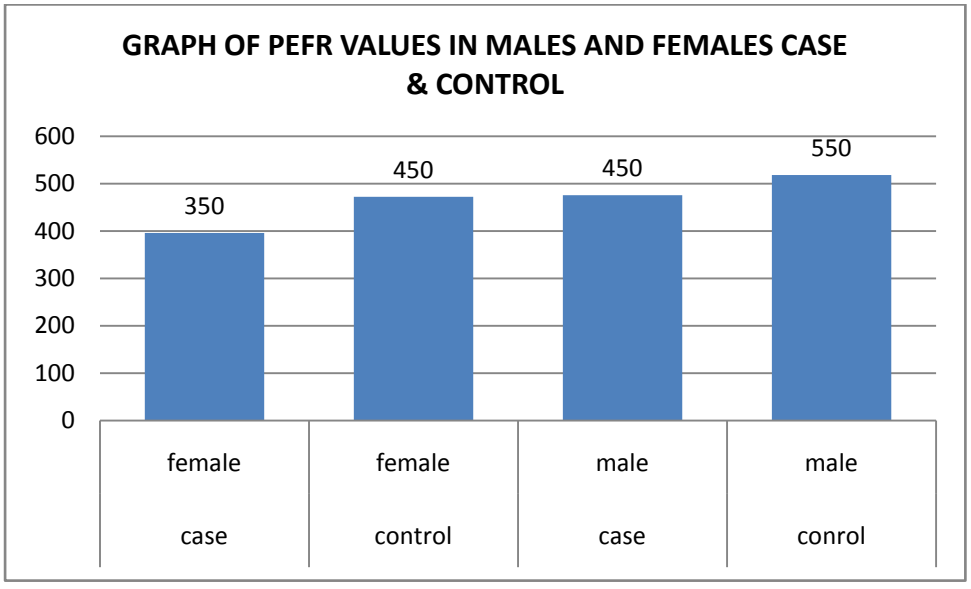


t = 1.1634, df=63, P Value=0.2491







t = 1.9551, df = 63, P value = 0.0550

Report : Result Of PEFR By Peak Flow Meter Of Males And Females

[CASE AND CONTROL GROUP]

No.	Participants	Sex	N=	Min.	Max.	Average	S.D.
1	CASE	MALE	50	3.0	5.0	350	O.440
2	CONTROL	MALE	15	4.3	5.1	450	.252
3	CASE	FEMALE	50	4.1	6.2	450	.584
4	CONTROL	FEMALE	15	4.0	5.1	500	.358

DISCUSSION

1. *Aging and genetic aspects in brief:*

In the chapter of Introduction, a brief presentation of a number of personalities of long age is given, with an intention that, when a person has a long life, which is healthy and devoid of complications related to aging, obviously this may be associated with retarded Homeostenosis of critical parameters.

Similarly there has been study of centenarians and the genes associated with aging. Heather E. Wheeler and Stuart K.Kim [1] state that "very little is known about the specific genes that affect the rate of aging or human life span"

They have also given the tabulated form of summary of gene association studies in long lived individuals. These studies pertaining to genes like APOE (ε4 allele of Apo lipoprotein E, as done by Corder E. H. et al. [2] and also, by Kervinen K. et al. [3]

Similarly the role of MTP (Microsomal Transfer Protein) as a marker associated with life span is given by Geesaman B.J. et al. [4]

Like wise, many other genetic studies related to APOC3 (Apo lipoprotein C3), by Atzmon G.et al. [5] and IGFIR (Insulin Growth Factor 1 Receptor mutation study by Suh Y.et al. [6],

Longer telomerase length and association with hTERT (Human Telomerase Reverse Transcriptase is shown by Atzmon G. et al. [7]

Studies related to Asian and European population with longevity and FOXO3A (Forkhead Box 03A) transcription factor are quoted by H.E. Wheeler and S. K. Kim, throwing light on studies related to serum Iron, Vitamin $B_{6,}$ Vitamin $B_{12,}$ plasma Arachidonic acid, plasma eicosa pentanoic acid, and many other age related trait studies done by study groups like BLSA, FHA, INCHIANTI, SardiNIA having excellent scientific consistency.

It seems that where there are less age related issues of homeostenosis, the longevity is determined by advantageous molecular scenario created by appropriate genetic function.

These authors have also presented association of parameters like BMI and weight in these age related critical traits in research of Framingham Heart Study. Keeping this in mind we also did the anthropometric study of elderly group.

The DNA Microarray characterization has lead to a new approach of analysis called 'Genomic Convergence' This according to authors may help better understanding of aging organ or tissues, and genotype of tissue or organ specific aging genes can have predictive values about declining of function. In future there is good hope for predictivity of homeostenosis as what authors say will provide new dimension to age related functional decline.

Heather E. Wheeler and Stuart Kim have given vivid account relating to genetic polymorphism and longevity, stating the role of ε4 allele polymorphism in genetic etiology of cardio-vascular disorders.

Atzmon G. et al. studied centenarians and long telomeres; (this is interesting as most aging individuals die of usually, hematological or cardio- respiratory disorder and cannot reach the centenary age.)

In our study, the selected anthropometric, hematological, cardiac and respiratory parameters of 50 males and 50 females in age range of 60-80 years were examined, and compared with 15(<4:1 ratio) of apparently healthy counterpart participants in the age range of 17-20 years; because in this young age, there is optimum development of these organ system, yet, they do not have age related changes of senility.

.As anticipated the values of different variables in case of females were less than values in case of male participants.

2. Aging and Hematologic study:

Alexander Panda et al. [8] have given an account of human immune senescence and while describing this part, author states that this part of aging related innate immune senescence is incompletely understood. They have mentioned role of diverse cells like neutrophils, mono cytes and eosinophils as well as basophils in this context.

This indicates to focus on the corpus of information in age related hematologic changes.

The hematological reference or normal values in form of intervals were selected from various source [9, 10, 11] and compared. Although there was nominal difference among them, but by and large, they were near one another. The sources

selected did not mention standardized reference values for elderly group or aging population; and hence the assessed value was compared with the young adult values

Some experts believe that “Iron can react with oxygen species to form free radicals; leading to protein damage accumulates with age.” And mentioned that too little iron causes anemia and too much iron may be toxic. As such, this indicates necessity to undertake hematologic assessment in aging population.

Sunita Wickramsinghe and Geffrey McCullough [12] have mentioned that, there is reduction in the amount of trebecular bone and haemopoiesis, accompanied by an increase in fat cells but only in sub cortical regions, in addition, other cells normally present in the bone marrow such as lymphocytes, plasma cells, and mast cells may increase in bone marrow of older people.

Chiu Wah Tsang et al. [13] studied hematologic indices in an older population sample to derive the healthy reference values. These authors mention that the reference values for elderly may differ from those of young people. These authors have given 11 series from different authors giving details of commonly employed hematologic parameters. Two of these series are having large population number between 1000-2000 participants, yet many are in range of 100-200 subjects, this sample size may be perhaps suitable for determining reference values, however the sample size of series of Zauber N. and Zauber A. [14] and Jarnigan J. et al.[15] have sample size nearer to our study. All these authors have presented parameters like Hemoglobin value, Hematocrit, Mean Corpuscular Hemoglobin, Mean Corpuscular Volume, Total W.B.C. count, Total Platelet count, and some biochemical relevant tests. In our study, in addition we did differential W.B.C. count, Mean Corpuscular Hemoglobin Concentration, R.D.W. [Red Cell Distribution Width] and Erythrocyte

Sedimentation Rate. [E.S.R.] Chiu Wah Tsang et al. have studied non Indian subjects who differ in many ways like diet, ethnicity, life style etc. and their objective for study is also different yet in general our results are comparable to their findings. In Indian population study of Preeti Jain et al. [16] and Padalia M.S. et al. [17] have close similarity to our findings. A.J. Sinclair, J.E. Morley and Bruno Velas in Pathy's Principles and Practice of Geriatric Medicine [18] mention that, the cause of low hematologic parameters in aged is by reason that there is decrease in bone marrow reserves in response to high demand. These authors have mentioned 7.0 % prevalence of iron deficiency anemia at 50 years of age, but according to Chaves, Asher, Guralink et al.[19] by 80 years it goes above 30 %[31.4%],however, the idiopathic anemia of aging occurs in 23.0 % of aged population, due to hemopoietic stress. Also, Pennix B. W. Pahor and Cesari M.et al.[20] have stated that it is due to debility and diminished muscular performance and muscle strength, but Ershler W.[21] has focused on cytokines in causation of anemia in aged. It is noteworthy that Zauber N.P. And Zauber A.G. [22] hold that with aging the hemoglobin level does not change significantly.

Joosten E., Pelemans W. and Hiele M.et al. [23] mention that along with a large number having undiagnosed anemia, prevalence rate in chronic disease associated anemia in geriatric population is 35-40 %, Iron deficiency anemia about8-15 % and vitamin B_{12} deficiency anemia is about 5.0 %.

Pathy's Principles and Practice of Geriatric Medicine [18] have given an elaborate list of causes of age- related anemia. Accordingly, it may be due to life style changes, like, shopping, cooking, feeding, GIT issues, hormonal issues, neuro-endocrinal issues, or alcoholism, lipid phobia, dementia, bereavement, psycho- social

disturbances, malignancy, GIT infections, neurologic issues, effects of medicines, effect of Opoids, role of Ghrelin, Neuropeptides, CCK, GLPYY, Leptins, role of cytokines, and issues of Oraxin A/ B

It is estimated that aging reduces food intake by about 30 % and may cause anemia according to authors of Pathy's Principles and Practice of Geriatric Medicine thus this account of nutritional anemia in aging population is clinically also impressive for diagnosis or differential diagnosis of etiologic mechanism operating in a particular case.

The above mentioned factors are not the target problems of thesis and are presented only to demonstrate the plurality of etiologic mechanisms related to homeostenosis of hematologic parameters.

When compared with young counterpart, values of Hemoglobin, PCV, and Mean Corpuscular Hemoglobin Indices were less in aged population as shown in graphs and tables; although, all indices were within normal limits of reference values shown, related to the parameter, in general.

In one study, done recently [24] about elderly population of Vadodara city, there was decrease in comparable values in mentioned parameters with increase in MCV. This was not the case in this study; but, instead of the megaloblastic picture, hematological picture suggestive of iron deficiency was seen in this study. This Suggests that there may be pockets of differing presentation types of in aging population in city, and this being study with small size of population cannot provide any conclusion about the type of anemia affirmatively. It was also noted that however, that the values were close to normal limits in most of the cases. The similar studies [16, 17] done elsewhere gave comparable results.

This indicates need to focus on the corpus of information in age related hematologic changes.

Study of Cardio-vascular homeostenosis in aging population:

Desler et al. [25] maintain that, "aging has been demonstrated to reduce the fidelity of myocardial mt DNA resulting in reduction of maximal respiratory capacity. Aging therefore further sensitizes the heart to acute and chronic stress, lowering the threshold of damage the heart can endure."

In this study, the values of SPO2 in male as well as female subjects were within normal limits and as such no abnormality is detected in these findings

The radial pulse tracings were showing as per expectation, the changes of heart rate variability common in this age groups, the effect of respiration was also as expected, but as shown in photograph, in rare case occasional low volume beats were noted which too were asymptomatic and hence, not critically suggestive of any noteworthy correlation is discussed.

Heart rate, Rhythm changes, the arterial blood pressure changes in SBP, [Systolic Blood Pressure] DBP, [Diastolic Blood Pressure], and the pulse pressure changes are parameters having bearing and important correlation to disorders of Cardio-vascular system in aged; hence the study of HR[Heart Rate], ECG[Electro-Cardio-Gram] (all 12 Leads), and blood pressure assessment were done.

Fleg J. L. and associates, [26] mention that in supine position, at rest, the heart rate in healthy men does not change with aging. Tsuji H. Larson MG, Venditti FJ et al.[27] state that beat to beat fluctuation of HR commonly known as heart rate variability , steadily declines with age also, as quoted by EG Lakatta and Daniel

Levy[28] , reduced heart rate variability is an indicator of cardiac autonomic regulation commonly found in older people and has been linked to increased and fatal out comes.EG Lakatta et al. in same article also hold that isolated Atrial Premature Beats (APB) appear on resting ECG in 5% to 10 % of subjects older than 60 years and are generally not associated with heart disease;

Increase in prevalence and complexity of both supra ventricular and ventricular arrhythmias whether detected by resting ECG, ambulatory monitoring or exercise testing occurs in otherwise healthy older patients but not in younger persons, also short bursts of PSVT 1%-2 % are seen in apparently healthy individual older than 65 years who were rigorously screened to exclude disease, according to EG Lakatta and Daniel Levy. We found only one case of such ventricular rhythm disturbance as ectopic ventricular beat.

By quoting Hiss, (1960), Simonson & Keys,(1952),Simonson,(1961) Best and Taylor[29], have described details of characteristic changes of ECG associated with aging, like P-Q, P-R, Q-T prolongation in ECG of elderly, with decreased voltage changes in P, R, and T waves, and axis changes of P and QRS waves, with aging. Our observations are shown in the graphs and dedicated tables. In our observation, P wave changes were more common as anticipated as well as, only one case (2 %) of asymptomatic ectopic bizarre ventricular complex.

JD Pathak [30] has done mile stone study [in 1975] in his monograph of Indian elderly where he has shown HR(mean) as 75.9 beats per minute in males and 76 beats per minute in females, which our corresponding findings are as; 86 beats per minute in males and 85 beats per minutes in females. Arterial blood pressure in his series was-systolic- 100-204 and diastolic as 60-130 mm of Hg. He has also given

hypertension values derived by different authors of that time, however, many of those values are not in practice today. Whereas in our series systolic blood pressure value was138 mm Hg. in males and 136 mm of Hg. in females whereas diastolic in males was 80 and in females was 81 mm of Hg.[by digital B.P. apparatus].

While presenting ECG changes JD PATHAK mentioned that, in his series, 2/3 of participant population had no abnormality and 1/3 had only minor abnormality. Our findings are expressed in tables and graphs related to ECG changes.

He states, occurrence of about 8.3% [15/180] ECG anomalies in his series of participants, where as we found about 10 % such anomalies but practically all were of innocent and asymptomatic. He had many extra systole cases [15] and [6] Brady cardia, we had almost all cases of P wave changes and only one case of ventricular bizarre complex.

O P Sharma et al.[31] have mentioned probable occurrence of LVH in over 50 % of people, older than 65 years, but in our study [though the sample size is small, we had asymptomatic cases of LVH perhaps, because of exclusion criteria, (where we attempted to exclude such occurrence) and also probably, due to selection of participants had uncomplicated and well gratified daily unaided living with lot of supportive role of their councils and associations, medical health care, adequacy of recreational and physical activities and safer ambience, here in this series, cardiovascular disease is perhaps not as prevalent as 50 % as OP Sharma et al. have observed.

These authors have also presented association of parameters like BMI and weight in these age related critical traits in research of Framingham Heart Study. Keeping this in mind we also did the anthropometric study of elderly group.

Study of Ring and co- workers (1959) as quoted by Best and Taylor, found that blood flow from fingers show a fall from 4.77 to 2.76 ml. per finger volume per minute, between age of 40 and 60 years. Oxygenation at alveolar membrane and response of peripheral blood vessel to heat/ cold is due to change in speed of response rather than final degree of vaso dilatation or vasoconstriction, according to Kety-1956 (Best & Taylor) [29].

SpO2 in our study indicated mild to insignificant change, as it is 97.5[Mean] in males and 97.7 [Mean] in female elderly.

The demonstration of resistance to heart rate variability and higher rise of heart rate with sub maximal exercise as compared to younger group may be due to perhaps impairment in regulatory mechanisms.

Best and Taylor[29] have demonstrated that, work, power, and rate of work of both ventricles diminish significantly with aging, still however, it is also mentioned by quoting work of Burrows and associates, by these authors, that although the tissue succino-oxidase enzyme levels reduce, the isolated intra mitochondrial succinooxidase activity is not decreased.

This may perhaps tempt to hypothesize that the metabolic dysregulation is perhaps less influential than neural or higher central regulation in performance characteristics of ventricular efficiency in aging persons.

According to J.D.Phatak, [30] normal range of heart rate as set by AHA is 50-100 beats per minute.

He observed the mean heart rate as 75.9 in males and 76 beats per minute in females.

In this study, the mean HR in males is 86.02 Beats per minute and females 85.78.Beats per minute which is higher than values demonstrated by Pathak but still in normal limits. This finding may be because of white coat effect. Our findings of elderly group's blood pressure – Systolic, Diastolic and Mean Blood Pressure is comparable with those of other investigators.

The basal blood pressure as mentioned by Pathak, in 140 old males is 136.9 mm Hg. (Mean) Systolic; and in 40 females (old) is 142.3 mm Hg. (Mean) Systolic; and Diastolic (Mean) blood pressure was respectively 83.9 and 82.7

For the study of ECG, we took the help from book of Tomas Gracia[31], and Leo Schamroth.[32]

Schamroth has mentioned about cardiovascular "Normality and Abnormality" stating that, Electro cardiographic abnormality may occur in normal healthy persons and in absence of organic heart disease; and also, Organic heart disease may occur with normal electrocardiographic patterns.

Respiratory System Homeostenosis:

O.P.Sharma [33] while giving changes in elderly, upper respiratory structures, chest wall, Respiratory muscles, lung structure changes like shallow alveoli, increased diameter of alveolar duct and Respiratory Bronchioles described. Decrease of Mean Bronchiolar Diameter, which is the main determinant of air way resistance, is said to decrease significantly and this may be the leading clue to FEV1/FVC changes.

Author of Fishman's Pulmonary Disease and Disorder [34] has given numerous changes associated with aging in Respiratory System, like tissues of lung, in airways, changes in mechanical properties, surface forces and also changes in macro molecules in aging lung which are useful to understand Respiratory Homeostenosis of aged. Lung parenchyma changes like those in pulmonary alveoli and bronchiolar dilation are described. Increase of Mean Linear Intercept, decrease of surface: alveolar volume ratio, net decrease of 15% in alveolar surface area, diminished recoil pressure at defined lung volume, decreased Gas / Liquid interface and surface area of lung are important age related changes treated in depth by them. Moreover, increase in pleural and pulmonary elastin and d-Aspartic acid with changeover to ^{14}C.

Murray and Nadal have described many respiratory changes in elderly individuals. [35]

Lowery E.M. et al. [36] have given many salient observations of age associated changes in their article. A.P. Fishman et al [34] have expressed that age related changes in connective tissues *do not* provide sufficient explanation for diminished elastic recoil found in aging.

Also structural molecules like elastin etc. are affected in such a way that there is diminished elastic recoil and diminished pulmonary compliance. Due to trapping of air in the small air ways, diminished elastic recoil, diminished force of strength of diaphragm and other respiratory muscles and thoracic stiffness. R.V. increases; but VC, PEFR, FVC, FEV1, and FEV1/FVC decrease with aging. FRC is mentioned to have increase with aging. DLCO and SaO2 and PaO2 diminish. Air way reactivity is increased and so also FRC and RV. [Our SpO2 value indicates mild to nil degree of depression]. Respiratory drive for hypoxia and hyper carbia is reduced.

Above mentioned changes clearly describe that these changes conjointly play role in producing COPD, ↓VC, ↓FEV1 / FVC and ↓PEFR.findings.

These observations clearly support the findings of Respiratory Homeostenosis observed by us particularly the FEV1/ FVC and PEFR are diminished in female elderly, because of perhaps contribution of hormonal and psychosocial factors along with factors described by various experts as given above.

The observations of Christopher Dyer and Carlos A.Vaz Fragaso et al. [37] give in depth aspects of mechanisms of respiratory functions and structural alterations and aging.

Also Gulshan Sharma, James Goodwin [38] have given an account of effect of aging on respiratory system physiology and immunology and tabulated presentation of anatomical and physiological changes of respiratory system with aging. As mentioned above, FEV1, FEV1/FVC, PEFR, values diminished in our subjects well correlate with the findings of these authors.

The table and graphs of each individual parameter with min, max, mean standard deviation, *df, 'p'* value etc. are given along with our findings.

The Computerized Spiro meter can give MVV (Maximum Voluntary Ventilation) and SVC (Slow Vital Capacity) but manufacturers of Spiro meter Software have indicated that these assessments are strenuous workouts and hence we did not determine these parameters for our participants.

SVC is assessment of FEV.2L- FEV - 1.2 L can help diagnosing large airway obstructions. These SVC positive individuals are not selected by exclusion criteria on the ground of their having large air way obstruction. Our subjects, particularly female elderly had a mild degree of COPD which is in accordance to Pathak's observations wherein he states that, FEV1 of both the sexes is about 70%.

This supports our finding of lower vital capacity and FVC in females due to smaller built and poorer musculature.

We have not attempted to assess Respiratory Efficiency Test like 40 mm Hg. Test etc. due to obvious reason of susceptibility of aged participants particularly females to respiratory strain.

From study by Pathak on Senior Citizens of India where Respiratory Efficiency Test, Maximum Breathing Capacity and Breath Holding Time was also quite low and only 9 % to 13 % could reach the normal young adult level. So these tests are omitted by us as the results are shown to be clearly very low.

The NHLBI / WHO Global Initiative for Chronic Obstructive Lung Disease Workshop summary mentions that "a low peak flow is consistent with COPD but has

poor specificity because it can be caused by other lung diseases and by poor performance."

Our subjects could perform well with, rather preferred conventional PEFR meter than Computerized Spiro meter. The existence of lung diseases was ruled out at an early stage of clinical examination so our findings of PEFR are by this uncomplicated instrument. However, the instrument we used meets Euro scale standards.

Respiratory changes in aging are well summarized by Gulshan Sharma and James Goodwin [38], as well as by Lowery EL, et al. [39].

In literature 2 different respiratory impairment assessment criteria are prevailing. Like GOLD and LMS.

We have attempted to study respiratory variables by computerized spirometry, the ATS (American Thoracic Society) guidelines and adopted in GOLD criteria, because as CA Vaz Fragaso et al.[35] have mentioned that "Spiro metric reference values for the LMS method are currently unavailable for non-white and those aged >80 years." by quoting two references.

Our method of assessing Spiro metric values and hence criteria we followed for COPD, in line of Global Initiative method; by which, variable of FVC1/FVC as 73.3. % in male participants and about 68% in female participants as shown in tables are assessed.

According to those norms, Mild or Stage I, is FEV1/FVC< 70 %, but FEV1>/=80 % predicted. Accordingly in our cases , of females, 68.8 % FVC1/FVC and FVC>/= 80% is there, suggesting stage I COPD [mild] in female population, of

aging participants by this criteria. In male participants also at degree of reduction in FEV1/FVC is seen (vide graph).

Quoting Hardie JA, Christopher Dyer [40] has clarified that FVC decline with age occurs later than FEV1 and at slower rate, and hence, “There is natural fall in FVC1/VC from about 75 to 70 % by age of 70 years.” This would incorrectly diagnose such older people as COPD cases.

Also, Harris R.S. and Lawson T. V. [41] have mentioned that “the total expired air and sustained air flow are more important than the peak air flow alone in assessing the effectiveness of cough”, whereas, J.A. Smith et al. [42], have mentioned that “there is a predictable relationship between cough peak flow and number of cough re-acceleration produced within a cough epoch.” As such, we have assessed the expiration function by peak expiratory flow meter. It is well known that the elderly population often has cough clearance issues which in this way make the respiratory assessment meaningful.

Future Scope and Perspectives in Aging Problems:

The world has at present a large number of aging individuals; and their problems are varied and many.

Unfortunately the animal models for aging experiments are not successful in providing appropriate answer to issues of human beings as their structure, function, biological behavior, and molecular mechanisms are not exactly parallel to human beings, and hence the research about aging has to be done essentially in human beings only, where the ethical and many problems are inherent, including ethnic, life style issues and issues related to psychosocial and genetic issues. This indicates that the

research in aging is not only a challenging work but also a time consuming and expensive work particularly when it is a longitudinal study, with different unpredictable issues like drop outs, changes in diagnostic and assessment technology etc.

It is observed that India is a country with a very large number of young population, but sooner in coming 25 years changes of senility and decline of physical and mental functions and consequent issues of large number of economic, psycho-social, may complicate the fabric of national progress and arouse newer and multiple challenges. The health service sector, human resource sector and finance sector should venture timely to fore see and exercise adequate measures to handle these issues and its congeners successfully.

From medical point of view, if the research by Animal model is not rewarding lately, attempt have been made to resolve the issues by creating a mathematical physiology model to answer some pertinent queries. Such research papers like in rat cadio-myocyte assessment by mathematical physiology have already been seen in research journals of medical science.

SUMMARY AND CONCLUSION

We studied the community dwelling sample of apparently healthy 50 males and 50 females in age range between 60 and 80 years, meeting the inclusion and exclusion criteria ; for clinical profile related to hematological, and cardio respiratory condition and performed the assessment of anthropometric, hematological and cardio-respiratory parameters by objectively assessable scientific technique and after preparing the statistical data, analyzed it statistically appropriate methods to determine the existence and extent of homeostenosis (Decrease in functional reserves) in aging state of senior citizens of Vadodara city by comparing their health status with 15 (in ratio of <than 4:1) apparently healthy comparable young adults between age of 17 and 20 years dwelling in Vadodara city, in comparable environment for consistently admissible duration.

In conclusion, candidate arrived at an impression that there is homeostenostic state in aging senior citizens, both, males and females, of Vadodara city.

By studying the different anthropometric variables, hematologic and cardio-respiratory variables it suggests that there is noteworthy degree of homeostenosis is in blood and respiratory state of females of Vadodara city as compared to male senior citizens.

The impression made is that presently in the studied population of females the hematological parameters are more suggestive of iron deficiency anemia, and also there is mild but debatable tendency to mild stage I COPD in selected cases of critically affected elderly females.

The sample being small this can only give the cue and more such assessments with larger sample size critically selected without selection bias from cross section and studied longitudinally should be encouraged. By exclusion and inclusion criteria, the population consisted of participants in both male and female groups, the age specific healthy and natural aging individuals and probably as such the changes are limited and milder in nature.

The smart city of Vadodara having good senior citizen circles with plethora of health related reformative , recreational and health related activities and health conducive programs conducted by medical fraternity, have perhaps significant contribution in regulating the homeostenosis in senior citizens here and although changes are seen in small proportion of female population, with regards to blood and lung, they are not of grave dimension to herald worries; yet, monitoring health care management and lifestyle modification can help these changes of homeostenosis such that the aging comes closer to natural and healthy aging, barring the irreversible downhill course of inevitable issues like co-morbity or progressive senile immune deficiency, or molecular misfiring or issues related to genetic nature, and longevity enhancement drives have scope here.

FEMALE 1-50

ID	AGE-GRP	SEX	AGE	HT.	WT.	BMI	SFT	Hb	PCV	mchc	RBC-T	WBC-T	MCV	MCH	RDW	ESR	p	l	m	e	b	PLT.CNT.	HR	SBP	DBP	Spo2	P WAVE	QRS WAVE	PQ	QT	QTc	QT/QTc	QT/RR	P-AXIS	QRSAXIS	T-AXIS	FVC PR.	M.PRED.	%PRED.	FEV1	M.PRED.	%PRED.	FEV1/FVC%	M.PR.	%PR.	FEF25-75PR.	M.PR.	%PR.	PEFR
RPP	60-60	F	61	152	54	23.37	3.2	8.2	25	32.8	3.87	4700	64.59	18.6	15.5	12	64	35	0	0	0	3.46	86	126	80	99	101	76	143	540	540	100	30.96	34	-28	116	2.02	2.72	135	1.51	2.09	138	74.75	76.84	103	1.78	1.73	97	5
HMP	60-60	F	61	150	57	25.33	3.3	11	34.5	31.88	3.93	4700	87.79	30.03	11.8	30	50	47	2	1	0	3.91	90	116	74	97	108	91	136	366	377	97	21.96	83	93	86	1.95	1.95	100	1.46	1.55	106	74.87	79.49	106	1.74	1.44	88	6
MBP	60-68	F	68	164	92	34.32	5	12.3	37	33.24	3.79	7200	97.62	32.45	12.8	20	58	39	2	1	0	2.31	88	124	78	98	103	88	161	375	410	91.4	21.55	87	-90	84	2.46	2.63	107	1.83	2.09	114	74.39	79.47	107	2.04	1.95	96	5
LKP	70-74	F	74	152	50	21.64	2.2	12.3	37.1	33.15	4.48	7400	82.81	27.46	12.6	15	60	35	3	2	0	2.93	80	140	80	98	104	111	168	400	400	100	21.33	46	-13	23	1.93	2.02	105	1.37	1.53	112	70.98	75.74	107	1.34	1.17	87	6
BDP	60-67	F	61	150	50	22.2	3	5.8	20.8	27.88	3.62	3800	57.46	16.02	16.4	6	55	40	3	2	0	2.43	100	120	80	98	98	103	140	370	416	89	24.6	40	51	-54	2.11	2.2	104	1.69	1.79	106	80.09	81.36	102	2.47	1.69	96	5
DGP	60-64	F	64	147	61	28.2	4.6	11.5	33.7	31.08	3.76	6400	89.63	30.59	12.8	15	63	35	1	1	0	3.05	82	160	90	97	117	86	200	416	429	97	22.74	85	-88	-88	1.81	1.8	99	1.34	1.32	99	74.03	73.33	99	1.54	0.89	58	6
MDP	60-68	F	68	164	92	34.3	6	12.3	40	30.75	3.79	7200	105.5	32.45	12.8	20	58	39	2	1	0	2.31	80	124	78	98	96	100	170	420	414	101	22.4	83	41	14	2.46	2.63	107	1.83	2.09	114	74.39	79.47	107	2.04	1.95	96	5
RPP	60-60	F	60	152	50	23.3	3.2	7.2	23.4	30.76	3.87	4700	60.47	18.6	15.5	12	64	36	0	0	0	3.46	94	140	70	97	92	95	153	371	417	89	23.2	39	44	24	2.02	2.72	135	1.51	2.09	138	74.75	76.84	103	1.78	1.73	97	5
LKP	60-66	F	66	152	50	23.3	3	12.3	39.52	31.12	4.48	7400	88.21	27.46	12.6	18	60	35	3	2	0	2.93	78	130	80	98	95	93	157	372	396	93	19.3	16	36	-59	1.93	2.02	105	1.37	1.53	112	70.98	75.74	107	1.34	1.17	87	6
TRP	60-67	F	67	155	71	29.5	4.2	11.2	35	32	3.74	5500	93.58	29.95	11.5	6	65	33	1	1	0	3.04	73	130	84	99	97	103	170	421	486	87	20.5	50	52	58	2.3	3.25	141	1.82	2.41	132	79.13	74.15	94	2.59	1.79	69	5
LGP	60-66	F	66	152	60	25.9	4.3	11.1	34	32.64	4.33	7300	78.52	25.64	12.2	24	54	44	2	0	0	2.69	104	142	84	97	115	118	148	348	411	85	16.94	64	0	28	2.05	2.25	110	1.55	1.89	122	75.61	84	111	1.91	2.29	120	6
BNP	60-70	F	61	161	71	27.4	3.8	12.4	38	32.63	4.38	9500	86.75	28.31	13.3	16	53	43	2	2	0	2.78	101	138	84	99	125	102	135	343	405	84	23.2	71	14	36	2.36	2.37	100	1.76	2.02	115	74.58	85.23	114	2	2.92	146	5
SRP	60-70	F	61	150	55	24.4	3	8.9	30	29.66	3.53	6500	84.98	25.21	14.2	12	68	28	2	2	0	3.9	93	140	80	98	115	102	172	320	340	94	19.85	104	95	-8	1.95	2.25	115	1.46	1.8	123	74.87	80	107	1.74	1.73	99	5
KPP	60-70	F	61	156	82	33.7	5.2	11.6	34.9	33.23	4.27	7400	81.73	27.17	12.5	4	68	32	1	1	0	2.43	107	136	80	98	116	96	165	333	403	83	23.78	39	106	156	2.18	1.88	86	1.63	1.58	97	74.77	84.04	112	1.92	1.87	98	6
MRP	60-70	F	68	159	77	30.5	5	14.6	45	32.44	4.85	7100	92.78	30.1	11.3	8	55	43	1	1	0	3.2	100	140	80	98	127	125	182	553	638	86	36.86	45	27	-56	2.3	2.54	110	1.72	2.03	118	74.78	79.92	107	2.02	1.93	96	5
RSP	60-70	F	64	142	50	29.8	4.4	12.5	38	32.89	4.4	6500	86.36	28.41	13.6	13	60	38	1	1	0	2.27	86	140	80	99	116	87	161	350	361	97	20.06	-22	0	28	1.7	2.25	132	1.3	1.87	144	76.47	83.11	109	1.74	2.17	125	5
KMP	60-70	F	65	140	44	22.4	3.9	13.3	40	33.25	4.69	6000	85.28	28.36	11.7	6	64	34	1	1	0	3.54	94	138	82	98	116	101	175	358	433	83	22.5	27	-14	-45	1.62	2.15	133	1.24	1.49	120	76.54	69.3	91	1.66	0.93	56	5
LRP	60-70	F	62	147	59	27.3	4	12.8	38.7	33.07	4.35	7300	88.97	29.43	11.2	12	60	37	2	1	0	3.47	78	140	80	98	91	100	158	321	430	74	16.71	-14	-15	110	1.9	2	105	1.46	1.67	114	76.84	83.5	109	1.92	2.07	108	6
PJP	60-70	F	67	150	80	35.5	5.8	11.5	35.4	32.48	4.41	7200	80.27	28.42	13.7	8	57	41	1	1	0	3.88	101	130	80	98	93	93	162	378	456	83	25.36	0	42	1	2.31	3.47	150	1.82	2.62	144	78.79	75.5	96	2.52	1.99	79	6
SCP	60-70	F	60	154	62	26.1	3.6	10.6	32.3	32.81	4.38	6100	73.74	24.2	14.3	8	56	40	3	1	0	2.85	108	140	80	99	83	102	170	335	410	82	24.1	63	-19	51	2.29	1.93	84	1.84	1.27	69	80.35	65.8	82	2.7	72	72	6
LPP	60-70	F	68	156	65	26.7	4	9.5	30	31.66	3.76	6100	79.78	25.27	14.1	10	50	40	2	2	0	3.52	89	138	82	98	88	87	160	358	433	83	21.18	-87	-90	88	2.33	2.7	116	1.84	1.96	107	78.97	72.59	92	2.58	1.4	54	6
SCP	60-70	F	61	159	54	30.9	4.5	10.2	31.5	32.38	4.03	5900	78.16	25.31	13.1	14	66	32	1	1	0	3.21	88	136	80	97	110	93	163	425	410	104	25	53	38	56	2.44	2.52	103	1.92	2.16	112	78.69	85.71	109	2.66	2.98	112	6
NDP	60-70	F	69	152	50	31.1	5.1	10.5	32.1	32.71	4.27	5700	76.42	24.59	14	14	55	42	2	1	0	3.4	103	140	80	97	100	97	182	480	554	87	32.87	85	-88	88	2.17	2.75	127	1.72	2.24	130	79.26	81.45	103	2.46	2.08	85	6
UPP	60-70	F	61	153	57	24.3	3.8	11	33	33.33	3.86	5500	85.49	28.5	12.6	8	53	44	2	1	0	2.45	100	130	80	97	102	87	152	531	597	89	35.4	33	28	73	2.26	2.95	131	1.83	2.4	131	80.97	81.36	100	2.74	2.43	89	6
HPP	60-70	F	61	157	55	22.2	3.2	11.9	37.1	32.07	4.74	4000	78.27	25.11	11.6	6	62	34	2	2	0	1.88	106	140	80	99	118	101	175	358	433	83	25.39	122	74	158	2.28	2.17	95	1.75	1.92	110	76.75	88.48	115	2.22	3.12	141	6
BDP	60-70	F	67	150	50	22.2	3	5.8	20.8	27.88	3.62	3800	57.46	16.02	16.4	6	55	40	3	2	0	2.43	100	130	78	98	115	95	158	321	430	74	21.4	-145	113	118	2.11	2.2	104	1.69	1.79	106	80.09	81.36	102	2.47	1.69	96	5
HMP	60-70	F	61	150	57	25.3	3.9	11.8	38	31.05	3.93	4700	96.69	30.03	11.8	20	50	47	2	1	0	3.91	84	130	80	97	125	97	141	417	402	104	23.3	53	37	56	1.95	1.95	100	1.46	1.55	106	74.87	79.49	106	1.74	1.44	88	6
LLP	60-70	F	62	158	75	30.1	4.8	11.7	35.3	33.14	3.59	8400	98.33	32.59	14.4	10	68	28	2	2	0	3	96	136	80	97	91	82	176	482	542	88	30.89	16	36	-59	2.3	2.12	92	1.76	1.72	98	76.52	81.13	106	2.18	1.75	80	5
JMP	70-74	F	71	150	52	23.1	3.2	12.8	42	30.47	4.4	7500	93.33	28.44	14.4	10	67	29	2	2	0	3	94	134	80	96	115	92	162	363	419	87	22.7	40	51	-54	2.9	2.8	103	2.56	1.86	119	88.27	82.17	93.08	1.86	1.67	89.78	5
NUB	60-76	F	66	152	56	24.2	4	12.8	40	30.2	4.5	6500	83.1	26	12	10	67	35	6	2	0	3.02	78	140	84	99	122	91	131	373	385	97	19.42	-85	-88	88	2.8	2.9	96	1.48	2.2	148	52.85	53.12	100.47	1.78	1.7	95.5	5
HHY	66	F	66	155	60	24.97	3.8	12.8	36	33	4.1	5700	83.13	26.7	14	10	65	32	3	1	0	5.63	75	138	84	97	92	82	203	381	461	83	19.05	-140	70	114	3.8	3.88	97.3	1.88	2.13	113	49.85	58.9	118.15	1.6	1.82	113.75	6
KIB	65	F	65	158	66	26.44	4	12.2	38	31	4	6080	85.7	29.9	12	12	62	34	4	0	0	5.6	85	142	82	99	95	97	141	417	402	104	25.1	-12	-14	112	3.9	3.98	97.98	1.92	2.15	111	49.23	47.34	96.16	1.88	1.89	100.53	4
KJM	60	F	60	155	60	24.97	3.8	13.1	40	28.8	3.9	5400	90	30.2	10	15.1	59	36	3	2	0	3.2	80	140	80	97	105	93	157	372	396	93	19.84	50	42	48	2.8	2.9	103.5	1.46	1.56	1.06	52.14	51.2	97.67	1.65	0.8	48.48	5
SAP	60	F	60	160	58	22.65	3	12	40	28.6	4.1	6000	88	28.8	14	12.1	60	36	3	1	0	2.2	76	138	84	98	72	103	140	370	416	89	18.75	27	-14	35	2.8	2.98	106	1.44	1.58	109	51.42	54.21	105.42	1.43	1.96	137.06	5
RJS	69	F	69	158	58	23.23	3	11.5	41	30	4	8040	88.54	31.7	13	18	62	36	2	1	0	2.1	69	136	80	97	112	95	158	321	430	74	14.77	35	96	24	2.14	2.45	114	1.57	1.77	112	73.36	78.38	106.84	1.34	1.2	89.55	5
RHD	65	F	65	156	54	22.19	2.9	12.2	42	31	3.8	7500	87.34	29.7	14	13.1	61	32	6	1	0	2	65	138	80	98	92	83	203	381	461	83	16.56	39	14	36	3.22	3.36	104	1.49	1.63	109	46.22	49.58	107.26	1.76	1.95	110.79	6
HAG	60	F	60	160	60	23.43	3	12	41	30	4.2	6200	88.65	30.5	12	12	60	35	3	2	0	2.1	70	140	80	98	116	97	182	480	554	87	22.4	-22	27	36	3.3	3.38	102	1.68	1.8	107	50.9	51.58	101.33	1.58	1.77	112.02	6
JSD	70	F	70	164	65	24.17	3.5	11.8	40	30	3.6	5000	87.78	31	12	15	60	36	2	2	0	1	80	140	84	97	95	110	140	375	412	91	19.5	32	20	116	3.24	3.44	106	1.9	2.13	112	58.64	58.42	99.62	1.67	1.79	107.18	5
MNA	70	F	70	162	58	22.1	3.2	13.2	42	30	3.8	4050	89.54	30.3	14	11	60	36	3	1	0	2	78	140	78	96	122	108	138	376	410	91	17.55	63	41	24	1.87	2.28	121	1.42	1.42	100	75.93	81.9	107.86	1.58	1.73	109.49	4
KD	68	F	68	154	60	25.3	3.6	11.4	41	30	3.6	7000	87.44	27.7	14	13	59	37	4	0	0	1.8	70	138	80	97	112	100	138	370	400	92	17.27	48	40	68	2.88	3.21	111	1.58	1.66	105	54.86	68.88	125.55	1.8	1.9	105.5	5
KDB	64	F	64	156	60	24.66	3.4	11.3	40	30.2	3.2	5000	87.77	28.9	16	10	58	38	4	0	0	1.6	76	142	84	98	132	106	140	412	424	97	20.9	70	68	70	3.12	3.2	102	1.72	1.9	110	55.12	54.62	99.12	2	2.08	104	5
JRM	62	F	62	155	50	20.81	2.6	12.7	41	31.12	3.5	7000	89.34	27.6	16	10	46	49	4	1	0	1.8	77	142	86	98	72	104	145	345	417	82	17.38	42	22	-55	2.24	2.38	106	1.46	1.58	108	65.17	82.44	126.49	1.49	1.55	104.02	5
SAS	60	F	60	158	54	21.63	2.8	13	42	30.1	4.1	8000	90	29.9	14	12	48	45	6	1	0	2	80	130	80	97	76	112	170	326	440	74	17.38	-16	18	53	2.14	2.26	105	1.44	1.64	113	67.28	79.6	118.32	1.76	2.1	119.31	4
RAP	66	F	66	159	60	23.73	2.9	11.6	40	30.8	4	7500	92.25	32.3	12	16	66	30	3	1	0	2.4	82	140	86	97	80	104	170	320	349	92	21.85	35	13	-35	2.2	2.28	103	1.38	1.38	100	62.72	78.98	125.96	2.08	2.1	100	5
UAR	66	F	66	157	64	25.97	4.3	12.2	42	31.9	3.8	9500	89	31.3	13	12	58	37	4	1	0	1.8	76	140	82	96	92	112	168	400	406	99	20.27	19	8	40	3.14	3.22	102	1.8	1.9	105	57.32	60.28	105.16	2.2	2.3	104	5
SPP	62	F	62	156	65	26.71	4.5	12.5	42	32.2	4.2	5000	89.89	30.13	10	12	58	36	4	2	0	1.2	75	138	82	98	98	100	157	340	410	83	17	-20	-15	85	2.86	2.9	101	1.5	1.58	105	52.44	60.46	115.29	1.77	1.9	107.34	5
STB	62	F	62	156	66	27.12	4.6	11	39	30.7	4.1	10000	90.2	29.45	12	14	50	45	4	1	0	2.2	74	132	82	98	106	98	160	378	450	82	18.62	30	22	73	2.44	2.56	104	1.27	1.37	107	52.04	66.88	128.51	2.1	2.6	123	5
DRB	60	F	60	154	58	24.46	4	12	40	31.2	3.6	6000	90.78	28.8	10	15	56	40	3	1	0	2.1	80	113	84	97	103	96	165	380	460	83	20.26	-14	-14	110	3.12	3.38	108	1.86	1.89	101	59.61	57.42	96.32	1.8	1.78	98	5
JMI	60	F	60	152	57	24.67	4.1	11	38	32	4	11000	93.2	32.2	12	12.1	54	42	3	1	0	1.6	82	136	86	98	101	93	174	360	430	78	19.7	52	40	55	2.47	2.68	108	1.53	1.65	107	61.94	66.8	96.25	1.68	1.88	111.9	4
MRP	63	F	63	158	58	23.23	3.3	14.6	43	31	3.8	7000	93.27	32.7	10	13	58	38	3	1	0	1.4	78	140	82	98	100	103	150	362	416	87	18.8	36	60	46	2.12	2.4	113	1.38	1.4	101	65.09	74.33	114.19	2	2.16	108	4

Male 2-50

ID	SEX	AGE	HT	WT.	BMI	SFT	Hb	RBC-T	WBC-T	PCV	MCV	MCH	MCHC	RDW	ESR	P	L	M	E	B	PLT.CNT	HR	SBP	DBP	Spo2	PWAVE	QRS	PQ	QT	QTc	QT/QTc%	QT/RR%	AXIS-P	AXIS-QRS	AXIS-T	FVC	MPRED	%PRED	FEV1	FEV1MPRED	%PRED	FEV1	FEV1M	%PRED\ FEV1/FVC	FEV1/FVC	MPRED	%PRED	FEF25-75	PEFR
HKP	M	65	166	88	31.93	4.8	14.99	4.8	8100	45	88.12	32.08	33.33	12.2	9	56	40	2	2	0	303	90	124	76	98	125	96	171	323	430	75.11	58	81	49	-140	2.94	2.14	101	2.3	2.02	107	2.74	202	74	2.74	79	103	1.8	550
PNP	M	62	163	75	28.22	3.6	14.49	5.01	5600	44	86.63	29.94	33.33	13.1	6	54	44	1	1	0	195	88	136	80	98	125	83	165	337	426	79	54	180	170	165	2.87	2.09	103	2.4	2.7	115	2.82	2.7	96	0.982	73.3	97	1.88	550
MKP	M	63	164	57	21.19	2.4	14.99	4.73	7200	45	95.14	33.4	33.33	12.2	8	66	32	1	1	0	266	87	140	80	97	101	90	166	353	397	89	47	32	11	110	3.72	2.11	131	2.72	1.86	129	2.79	1.86	67	0.75	79.4	104	1.97	450
GDP	M	66	167	80	28.68	4.8	13.53	4.5	7400	40.6	90.22	30.89	33.33	12.7	13	60	36	2	2	0	226	84	138	82	98	81	105	143	357	385	92.72	45	32	26	33	2.55	2.16	87	1.69	0.89	78	2.71	0.894	33	1.06	64.1	83	1.9	450
KLP	M	73	164	74	27.51	4.6	12.41	4.59	7200	37.4	90.54	30.75	33.32	14.1	12	66	30	2	2	0	392	84	142	82	99	122	92	162	375	380	98.68	44	70	-24	-31	2.87	2.11	101	2.09	1.48	99	2.79	1.47	53	0.972	58.7	77	1.8	450
HMP	M	68	163	53	19.94	2	13.32	4.13	7100	40	92.97	31.35	33.33	12.2	18	76	20	2	2	0	249	83	126	80	98	120	92	160	358	380	94.21	40	70	28	30	3.92	2.17	138	2.97	2.28	137	3	2.28	76	0.765	83.9	109	2	450
RPP	M	68	165	80	29.38	5.4	13.83	3.7	6700	41.5	85.04	29.3	33.33	12.2	20	66	35	3	2	0	235	78	116	80	99	105	92	93	493	583	84.56	69	44	71	62	2.67	2.25	91	1.96	1.36	87	3.04	1.36	45	1.13	64.1	82	2.1	450
MMP	M	68	175	76	24.81	4.4	12.6	4.88	4300	37.4	90.54	30.75	33.1	12.3	5	54	42	2	2	0	207	78	140	80	97	110	92	150	380	380	100	39	88	64	110	3.95	2.67	114	2.78	1.82	104	3.27	1.83	56	0.827	74.6	87	1.9	450
HMP-2	M	68	163	53	19.94	2.1	14.9	4.13	6700	43.5	90.25	30.5	33.2	12.2	18	76	20	2	2	0	249	80	150	80	98	112	93	143	387	423	91.48	48	81	28	-32	3.92	2.17	138	2.97	2.28	137	3	2.28	76	0.765	83.9	109	1.9	400
PVP	M	71	165	70	25.71	2.8	13.2	4.82	6000	42	88.05	29.56	33.2	12.9	8	56	40	2	2	0	205	84	130	80	97	110	91	150	482	393	122.6	32	50	10	42	3.76	2.21	129	2.8	2.03	127	2.94	2.02	69	0.78	86.6	111	2.1	550
MPP	M	68	169	73	25.55	3.7	12.8	4.77	7100	38.7	91.06	31.37	33.1	12.2	10	66	30	2	2	0	322	86	130	80	97	110	95	202	460	429	107.2	42	48	-48	144	2.52	2.41	80	2.2	3.01	91	3.11	3.01	97	1.23	71.2	87	2.3	500
RSP	M	69	171	87	29.75	6	12	4.25	5500	43	95.51	31	30	11.3	10	66	32	1	1	0	244	82	140	80	97	108	95	175	540	623	86.6	73	87	90	88	3.8	2.47	118	2.91	2.58	118	3.1	2.57	83	0.81	73	88	1.86	450
NPP	M	65	166	65	23.58	4.3	13.7	4.71	5700	43.1	89.57	30	31.7	12.2	8	68	30	1	1	0	269	78	130	80	97	107	88	172	345	388	88.9	45	44	15	68	2.87	2.14	99	2.34	2.43	109	2.74	2.43	89	0.95	66.4	86	1.78	450
KKP	M	64	163	76	28.6	4.9	13.3	4.7	7100	39.3	90.76	30.95	31.2	12	6	74	23	2	1	0	300	79	160	90	97	110	107	142	381	439	86.78	51	51	40	129	3.54	1.84	135	2.51	1.41	136	2.28	1.41	62	0.644	76	106	2	500
RSP	M	62	165	56	20.56	2.1	13.17	4.33	9700	40.8	91.28	30.87	32.3	11.9	16	62	36	1	1	0	202	84	160	86	96	81	101	193	381	393	96.9	42	36	-154	144	3.72	2.17	129	2.5	1.31	115	2.86	1.31	46	0.768	72.8	94	1.87	450
MMP-2	M	64	166	72	26.12	3.3	13.8	4.47	7400	43.2	96.86	32.29	33.33	11.6	4	62	46	1	1	0	220	82	110	80	97	97	117	177	475	442	107.4	42	86	-90	88	3.1	2.17	107	2.43	2.23	112	2.78	2.22	80	0.896	66.5	86	2.2	450
CJP	M	61	169	75	26.3	3.9	14	4.46	6400	41.9	85.51	28.57	33.3	11.7	20	53	44		1	0	277	88	150	80	97	98	107	193	445	414	107.5	39	72	66	68	4.04	3	114	3.2	2.86	107	4.37	2.84	65	108	86.2	94	2.34	500
MBGP	M	63	174	102	33.7	4.8	14.12	4.9	5700	43.2	97.3	33.56	32.7	13	8	60	39	1	0	0	300	78	130	80	94	93	91	150	482	393	122.6	32	50	10	129	3.97	3.14	106	3.28	3.35	104	4.33	3.33	77	1.09	99.4	106	2.4	450
RMP	M	69	171	84	28.7	4.9	13.85	4.44	6800	41.6	99.76	34.05	33.33	13.3	10	52	46	1	1	0	283	76	140	90	98	96	120	182	371	383	96.8	40	69	81	144	3.89	2.89	111	3.25	3.86	112	4	3.84	96	1.02	82	92	1.88	450
CMP	M	65	171	76	26	4.7	13.4	4.17	6200	41.2	87.1	29.39	32.6	16.4	10	58	39	2	1	0	256	78	130	80	98	96	91	171	372	346	107.5	34	41	60	88	3.74	2.98	105	3.05	2.98	102	4.18	2.96	71	1.11	94.8	104	1.96	450
VPP	M	66	163	80	30.1	5.1	13.44	4.73	5600	41	92.97	31.35	32.8	12.9	6	58	38	3	1	0	266	76	110	70	97	98	113	140	380	438	86.8	52	81	73	68	3.19	2.63	101	2.72	3.34	103	3.99	3.35	84	1.25	104.3	123	1.9	550
RPP	M	68	165	80	29.4	4.8	12.86	3.7	5400	41.5	85.04	29.3	31.01	12.2	20	66	35	3	2	0	235	88	120	70	97	93	112	156	251	274	91.6	31	60	-46	42	2.67	2.25	91	1.96	1.36	87	3.04	1.36	45	1.13	64.1	82	2.5	450
MMP-3	M	67	175	76	24.8	3.8	12.8	4.88	6700	40	90.56	30.75	32.04	12.3	5	54	42	2	2	0	207	80	140	80	98	106	112	156	358	380	94.21	42	70	28	68	3.95	2.67	114	2.78	1.82	104	3.27	1.83	56	0.82	74.6	87	2.21	400
HMP	M	68	163	53	20	2.8	13.44	4.13	6700	42	90.25	30.5	32	12.2	18	76	20	2	2	0	249	79	150	80	97	101	101	193	357	401	89.02	32	68	26	45	3.92	2.17	138	2.97	2.28	137	3	2.28	76	0.765	83.9	109	2.34	500
PVP	M	61	165	70	25.7	4.4	13.81	4.82	4300	42	88.05	29.56	32.9	12.9	8	56	40	2	2	0	205	76	130	80	99	105	107	144	353	397	89	34	32	11	-57	3.76	2.21	129	2.8	2.03	127	2.94	2.02	69	0.781	86.6	111	1.99	500
MPP-2	M	68	169	73	25.6	4.4	12.02	4.77	7100	40	91.06	31.29	30.07	12.2	10	66	30	2	2	0	322	76	130	80	98	104	95	200	371	393	94.4	31	69	81	-82	2.52	2.41	80	2.2	3.01	91	3.11	3.01	97	1.23	71.2	87	2.78	500
RSP	M	69	171	87	29.7	5	13.3	4.25	5500	43	95.51	31	31	12.8	20	66	32	1	1	0	244	77	140	80	97	126	91	150	380	438	86.7	44	81	73	-67	3.8	2.47	118	2.91	2.58	118	3.1	2.57	83	0.81	73	88	2.45	450
DGP	M	62	178	81	25.6	3.5	14.33	4.93	5700	43.1	89.57	30	33.33	12.9	8	65	33	1	1	0	249	76	130	80	98	113	92	150	251	274	91.6	32	60	-46	56	3.81	3.11	100	3.1	3.1	100	4	3.12	78	1.04	101.3	108	1.68	550
LLP	M	64	172	89	30.1	4	12.61	4.07	7100	39.3	90.76	30.95	32.1	12.4	6	64	34	1	1	0	241	93	140	84	98	111	92	143	372	390	95.38	47	41	81	156	3.67	2.62	110	2.98	2.97	114	3.35	2.98	89	0.912	70.9	83	1.63	500
GLP	M	67	175	82	26.7	3.2	12.75	4.92	7100	40.8	91.28	30.87	31.5	12.9	8	60	36	2	2	0	204	90	140	80	98	97	96	147	363	400	90.7	47	63	-67	45	5.13	2.67	148	2.67	1.03	100	3.27	1.01	31	0.63	68.3	79	1.7	500
RBP	M	62	170	84	29	4.6	15.3	5.19	5900	53.2	96.86	32.29	33.33	12.4	6	69	28	2	1	0	246	86	144	84	98	106	95	156	363	374	97	43	70	56	-32	3.54	2.58	108	2.85	2.83	110	3.4	2.82	83	0.96	70.4	84	1.85	450
MBNP	M	67	160	58	22.6	4	12.65	4.71	6000	41.9	85.51	28.57	30.2	12	6	68	29	2	1	0	242	81	142	80	98	112	93	193	537	537	100	41	43	49	-72	3.27	2.07	121	2.64	2.58	128	2.98	2.59	87	0.911	72.3	96	2.34	500
RNP	M	61	160	58	22.6	4	12.96	4.96	6100	43.2	97.3	33.56	30	12.6	6	58	38	2	2	0	388	78	140	82	97	78	101	215	354	397	89.16	54	43	11	39	3.54	2.22	126	2.88	2.93	130	3.3	2.93	89	0.932	97.6	125	2.11	500
PTP	M	61	166	75	27.2	3.9	15.6	5.24	5600	53.4	90.64	28.14	33.15	12.2	10	63	34	2	1	0	235	87	140	84	98	101	110	178	338	314	107.6	29	17	4	45	2.93	2.44	95	2.01	1.18	82	3.37	1.17	35	1.15	73.8	90	1.78	450
JPP	M	62	162	72	27.4	4	13	4.74	8000	36.1	84.9	27.83	32.69	11.6	10	56	42	2	1	1	308	79	140	80	96	115	103	178	410	423	96.9	43	32	-8	-10	3.41	2.26	118	2.66	2.35	118	3.25	2.34	72	0.953	82.9	105	1.76	450
BMP	M	63	171	97	33.2	5.2	10.5	4.06	4900	31.59	85.14	25.86	33.33	12.1	8	66	32	1	1	0	252	90	142	82	95	80	75	193	346	309	111.9	28	86	90	45	4.68	2.6	141	3.81	3.99	147	3.37	3.97	118	0.72	107	126	1.69	500
SVP	M	65	170	67	23.1	3.4	14.99	5.51	4800	45	77.59	29.4	33.33	11.2	6	62	34	2	2	0	193	84	144	84	96	81	110	158	338	314	107	49	17	4	42	3.64	2.52	112	2.88	2.67	114	3.26	2.67	82	0.895	92.9	112	1.95	550
NSP	M	65	161	74	28.5	4.1	13.9	4.72	6500	47.7	86.57	29.45	33.25	15	6	64	34	1	1	0	251	88	130	80	99	113	110	158	467	565	82.65	29	54	-3	30	3.47	2.16	124	2.85	3.11	132	3.09	3.12	101	0.89	69.1	90	1.93	500
PPP	M	65	167	88	31.6	5.1	15.3	5.45	4800	41.8	88.56	31.01	32	12.1	6	60	36	2	2	0	292	90	136	78	97	97	78	152	363	388	93.5	69	50	-24	110	4.28	2.58	133	3.57	4.11	138	3.61	4.11	114	0.843	91.8	109	2	400
JBGP	M	64	176	95	30.7	5.2	17.7	6.29	6600	49.4	90.64	28.14	33.15	11.8	14	52	44	2	2	0	194	96	140	80	98	133	91	178	353	397	88.9	43	32	11	-32	3.41	2.99	92	3.02	4.55	101	3.87	4.56	118	1.13	79	86	1.77	400
KHP	M	61	166	80	29	4.4	11.8	4.24	6900	53.4	84.9	27.83	32.69	12.6	16	54	44	1	1	0	314	100	142	82	97	122	88	193	357	382	93.45	41	70	29	42	3.46	2.46	111	2.91	3.73	118	3.41	3.71	109	0.98	92.3	112	2.22	550
RBP	M	65	168	70	24.82	4.2	14.2	4.64	5900	36.1	85.14	25.11	32.08	12.3	6	62	35	2	1	0	193	95	182	82	99	113	95	156	358	384	93.22	54	70	26	68	3.64	2.88	112	2.9	2.8	100	3.22	2.8	87	0.88	72	111	1.83	450
BKP	M	68	164	64	23.88	3.8	13.6	4.24	7000	35.2	78.27	26.21	32.09	12.3	10	60	36	2	2	0	260	80	140	80	98	113	95	193	380	380	100	29	88	64	56	3.6	2.46	113	3.82	4.11	155	3.44	4.09	119	0.95	86.8	112	2.87	450
MPP	M	76	160	58	22.6	3.2	13.4	4.4	7100	39.8	85.42	25.2	32.68	12.4	10	58	38	2	2	0	246	90	140	84	98	110	96	142	345	388	88.9	43	44	15	39	3.32	2.26	110	2.66	3.1	118	3.08	3.08	100	0.92	70	104	1.78	450
PDP	M	66	164	58	21.64	3	14.2	4.2	4300	36.2	86.46	26.42	32.42	12.2	10	60	38	1	1	0	360	100	140	82	98	98	92	201	381	439	86.78	28	83	40	-10	3.68	2.44	113	2.46	3.46	100	3.84	3.45	90	1.04	78.8	102	188	450
APP	M	66	160	72	28.1	5	14.4	4.6	5600	39.4	85.32	28.22	33.14	11.8	6	62	36	1	1	0	280	106	140	80	97	100	93	150	251	274	91.6	69	60	-46	-32	4.64	2.68	104	2.76	3.12	112	3.82	3.59	94	0.82	78	112	1.97	450
MBP	M	70	180	79	24.3	3.8	15.8	4.99	7800	38.8	82.8	28.42	33.12	11.2	13	56	42	1	1	0	340	100	140	80	98	96	95	150	380	396	95.95	29	81	22	42	4.34	3.23	110	3.25	2.43	101	4.13	2.43	59	0.95	100.1	105	1.48	450
HMP	M	68	163	53	20	2.6	12.7	4.13	7000	38.8	82.64	28.42	33.12	12.2	10	76	20	2	2	0	320	103	140	80	98	98	105	178	387	423	91.48	49	81	28	68	3.92	2.17	138	2.97	2..28	137	3	2.28	76	0.76	83.9	109	2	400
UIB	M	61	160	62	21	2.8	15.8	5	8000	42	86.82	30.1	33.33	10	10	58	38	3	1	0	230	110	158	86	98	96	101	171	482	393	122.6	45	50	10	-32	3.36	2.42	108	2.64	2.88	110	3.2	3.13	98	0.952	76	106	1.9	350
MMP	M	79	162	59	20	2	12.7	4.1	5000	40	82	30	31.4	12	9	57	38	2	1	0	300	100	142	84	98	100	107	143	355	400	88.7	32	70	28	88	3.6	2.86	110	2.46	3.75	106	3.8	3.8	100	1.05	88	102	1.76	400

Males Control Grp

ID	AGE	WT.kg.	HT.cm	BMI	SFT	Hb Gm%	RBC m.	PCV	MCHC	MCH	MCV	RDW	ESR	WBC	P	L	M	E	B	PLT. CNT.
1	17	62	160	24.2	3	15	5	45	33.33	30	90	10	10	6	62	35	2	1	0	1.4
2	19	63	163	23.7	3.2	14	4.7	44	31.81	29.78	93.6	12	12	7	64	33	2	1	0	2
3	17	65	165	23.8	3.2	14.8	4.8	45	32.88	30.83	93.7	12	12	10	58	38	3	1	0	2.2
4	17	60	160	23.4	3	15	4.8	45	33.33	31.25	93.7	12	11	9	59	36	4	1	0	1.8
5	19	60	172	20.33	2.8	14	5	45	31.11	28	90	10	12	8	60	36	3	1	0	2.1
6	18	62	172	21.01	2.1	14.2	4.8	44	32.27	29.58	91.6	11	10	9	60	36	2	2	0	1.6
7	18	65	176	21.03	2.1	15.4	5	44	32.46	30.8	88	10	10	7	62	35	2	1	0	1.8
8	18	67	176	21.7	2.1	15	5	44	33.33	30	88	10	12	10	67	25	5	2	1	2
9	18	64	172	21.7	2.1	14.8	4.8	45	32.88	32.17	93.7	11	12	6	63	29	5	2	1	2
10	17	60	165	22.05	2.2	14	4.8	44	31.81	31.81	91.66	13	12	8	60	33	4	2	1	1.5
11	19	50	170	17.3	2	14	4.5	42	33.33	31.11	93.3	13	12	7	63	33	3	1	0	3
12	19	58	172	19.66	3	14.7	4.8	45	32.65	30.62	93.7	13	10	9	61	34	4	1	0	1.7
13	20	68	170	23.52	4	14.6	4.8	44	31.37	34.76	91.66	13	10	10	70	26	3	1	0	1.8
14	20	62	170	21.45	3	14	4.5	44	31.18	31.81	97.7	14	11	7	60	35	4	1	0	3
15	18	60	170	20.76	3.1	15	5	45	33.33	30	90	12	12	10	61	36	2	2	0	1.6

Males Control Group

NO.	SBP	DBP	HR	spo2	P m.S.	QRS m.s.	PQ m. s.	QT.m.s.	QTc	QT/QTc%	QT/RR	axis-P	axis-QRS	axis -T	FVC -PR	M.PRED	% PRED	FEV1	M PRED	% PRED	FEV1/FVC %	MPRED	% PRED.	FEF25-75	M. PRED	% PRED.	PEFR
1	120	80	70	99	110	120	160	400	400	100	42.8	30.6	55	50	5.8	5.6	96.5	4.6	4.62	100.4	79.3	80	123.8	4	3.8	95	5
2	120	80	70	98	110	116	158	400	402	100	42.8	26.3	58	56	5.6	5.5	98.2	4.4	4.48	101.8	78.5	80.2	102.1	3.8	3.4	89.4	5
3	122	80	74	98	100	100	138	400	386	96.5	38	28.2	55	52	5.8	5.6	96.5	4.5	4.6	102.2	77.5	80	103.2	4	3.7	92	5
4	122	78	76	98	100	102	150	400	388	97	39.5	30.6	58	52	5.5	5.3	96.3	4.3	4.4	102.3	78.1	80	102.4	4	3.8	95	5
5	120	80	68	98	100	110	130	400	400	100	44	-110	60	56	5.3	5.2	98.1	4.1	4.25	103.6	77.3	80	103.5	3.7	3.2	86.4	4
6	122	80	72	97	100	100	136	420	420	100	41.6	30.2	58	50	5.8	5.6	96.5	4.54	4.64	102.2	77.6	80	103	4	3.5	87.5	5
7	120	78	72	98	100	98	133	400	385	96.2	41.6	33.8	50	52	5.6	5.5	98.2	4.4	4.48	101.8	78.6	80	101.7	3.6	3.4	94.4	4
8	120	80	72	98	110	106	130	400	380	95	41.8	38.5	58	56	6	5.8	86.6	4.5	4.5	100	75	75	100	4.1	4.1	92.6	5
9	124	80	70	97	100	108	130	400	388	97	37.5	36.7	60	60	5.6	5.5	98.2	4.4	4.48	101.8	78.5	80	101.9	4.2	3.8	95.2	5
10	122	80	74	97	110	100	140	400	388	97	40.5	30	55	56	5.3	5.2	98.1	4.08	4.24	103.9	75.4	75	99.4	3.7	3.5	94.5	5
11	110	70	72	97	108	98	145	400	375	93.7	42.8	66.6	52	56	5.6	5.5	98.2	4	4.2	105	71.4	75	105	3.6	3.5	97.2	5
12	118	78	74	98	110	97	131	400	380	95	38.4	65.2	55	60	5.6	5.5	98.2	4	4.2	105	71.4	75	105	3.5	3.5	100	5
13	120	80	70	99	100	98	130	400	380	95	42.8	-100	56	52	5.8	5.6	96.5	4.5	4.64	103.1	77.6	75	96.6	4	3.8	95	5
14	120	80	72	98	130	100	130	400	390	97.5	37.5	34.5	58	52	5.5	5.6	101.8	4.6	4.4	95.6	83.6	80	95.6	4	3.6	90	5
15	110	78	72	98	100	110	130	400	380	95	41.6	38.6	55	56	5.6	5.8	103.5	4.4	4.6	104.5	75.8	75	98.8	4	4.2	105	5

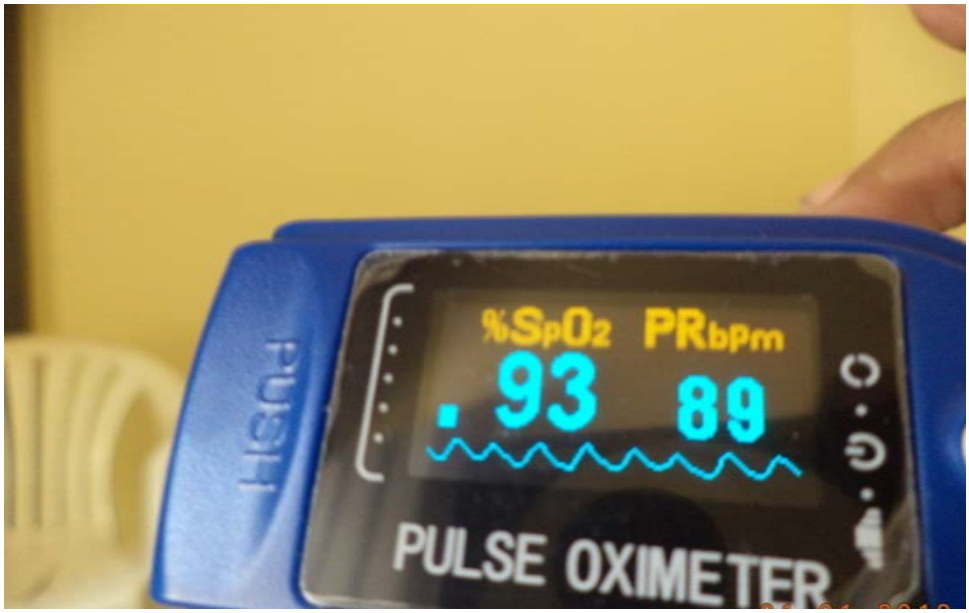
Female Control Grp

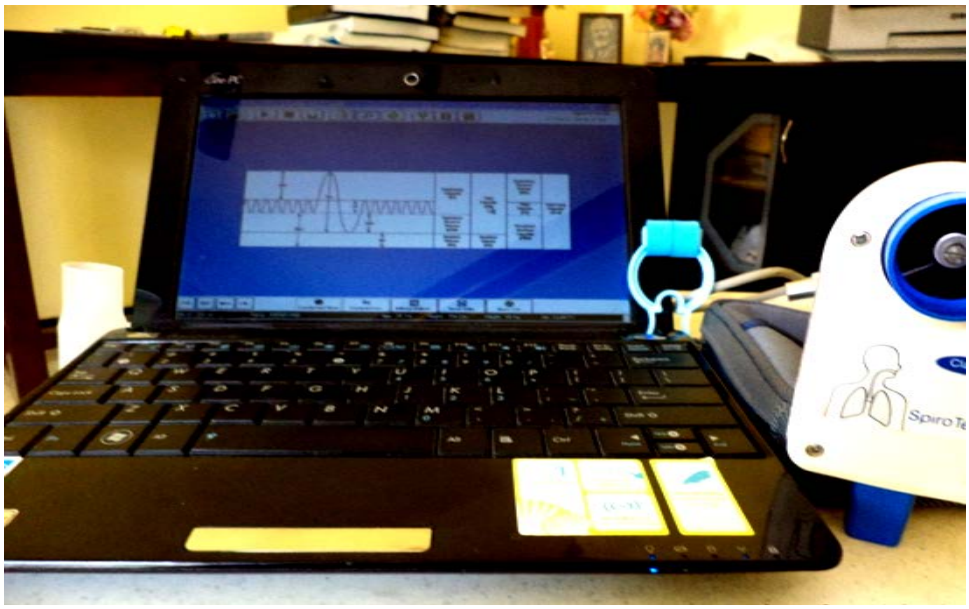
NO.	AGE-yrs	WT-kg	HT-cm	BMI	SFT	Hb-G%	RBC-m.	PCV	MCHC	MCH	MCV	RDW	ESR	WBC	P	L	M	E	B	PLT.
1	18	50	152	21.64	3.2	13.2	4.8	41	32.19	27.5	85.41	10	11	4	65	29	4	2	0	1.5
2	18	54	154	22.78	3.3	13	4.8	42	30.95	27	87.5	11	13	4.8	67	27	4	2	0	1.8
3	20	53	152	22.94	3.3	13	4.6	41	31.7	28.2	89.13	12	13	5	60	33	5	2	0	2.2
4	18	50	156	21.81	3	12.8	4.4	41	31.21	29.09	93.18	12	12	5.6	60	34	4	2	0	2.6
5	19	50	150	22.22	3.2	12.6	4.6	42	30	27.39	91.3	12	13	6.6	68	26	5	1	0	3.2
6	20	56	158	22.48	3.3	12.8	4.5	42	30.47	28.44	93.33	13	12	8.2	70	24	5	1	0	1.4
7	19	58	160	22.65	3.4	13	4.8	42	30.95	27.08	87.5	11	10	10	65	29	4	2	0	1.8
8	19	58	160	22.65	3.5	13.2	5	43	32.19	20	86	11	10	10.2	58	34	5	2	1	2.5
9	20	60	162	22.9	3.5	13.2	4.8	41	32.19	27.5	85.4	11	8	10	69	25	5	1	0	2.6
10	18	60	158	24.09	3.8	14	5.2	43	32.55	26.92	82.6	10	8	7.6	62	31	4	3	0	2.6
11	18	58	151	25.43	4	13.8	4.8	42	32.85	28.75	87.5	11	9	8.2	65	29	4	2	0	1.8
12	18	56	160	21.87	3.2	13.6	4.5	42	32.38	30.22	93.33	14	12	5.9	61	33	5	1	0	3
13	20	56	160	21.87	3.3	13.4	4.6	42	31.9	29.13	91.3	12	10	6.8	62	32	5	1	0	2
14	17	55	158	22.08	3.5	13.5	4.6	42	32.14	29.34	91.3	12	10	10.9	70	23	5	2	0	2.1
15	17	60	152	26	4	14	5	43	32.55	28	86	12	12	9	58	36	4	2	0	2.3

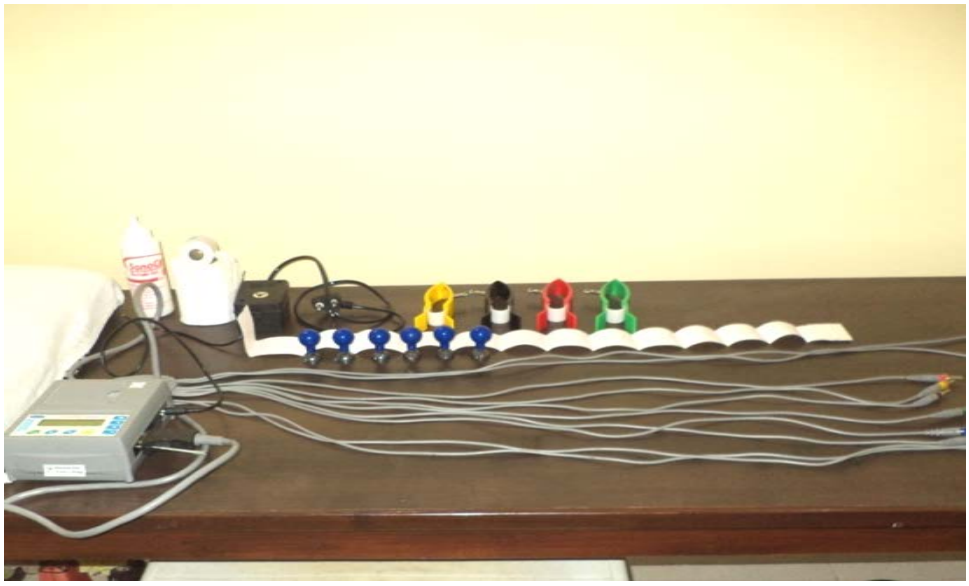
Female Control Grp

NO.	SBP	DBP	HR	SPO2%	P	QRS	PQ	QT	QTc	QT/QTc%	QT/R R	axis P	axis QRS	axis T	FVC-PR	M PRED	% PRED	FEV1	M PRED	%PRED	FEV1/FVC	M PRED	% PRED	FEF25-75	M PRED	% PRED	PEFR
1	120	80	72	98	110	120	150	400	400	100	41.1	30.3	58	50	5.2	5.1	98	4.16	4.12	99	80	78	97	3.2	3.1	96.8	500
2	122	80	74	97	108	118	160	400	400	100	40.4	38.4	56	50	4.7	4.7	100	3.52	3.46	98.3	74.8	75	100	3	2.8	93.3	480
3	124	80	74	98	109	116	145	400	370	92.5	40.4	28.4	52	56	5.3	5.2	98	4.24	4.2	99	80	75	93.7	3.4	3	88.22	480
4	120	80	72	98	111	100	158	400	385	96.2	41.1	36.8	60	52	5	4.9	98	3.75	3.7	98.6	75	74	98.66	3.2	3	93.75	400
5	118	80	76	98	110	102	140	400	370	92.5	39.4	38.5	60	53	4.4	4.4	100	3.52	3.5	99.4	80	75	93.7	3.1	3	96.77	500
6	110	70	75	98	110	110	140	420	400	95.2	40	-110	60	60	4.7	4.8	102	3.67	3.6	98	78	74	94.8	3.2	3	97.75	500
7	110	70	76	97	110	98	130	400	390	97.5	39.4	60	60	58	5	5.1	102	4	4.2	105	80	74	94.8	3	2.9	96.66	400
8	110	76	72	98	110	106	130	400	380	95	41.1	52.6	62	56	4.1	4.2	102	3.48	3.2	91.9	84.8	75	88.4	3	2.8	93.3	460
9	118	74	72	97	100	108	130	400	375	93.5	41.1	30.6	60	50	5.3	5.2	98	4.24	4	94.3	80	75	93.7	3.2	3	93.75	480
10	120	80	70	98	100	100	136	400	400	100	42.8	30	60	56	4.9	5	102	4.16	4	96.15	85	75	88.2	3.1	3	96.77	460
11	120	80	74	99	100	98	158	410	400	97.5	40.4	30	58	55	5	5	100	4.25	4.1	96.47	85	80	94.11	3.4	3.1	91.17	510
12	120	80	72	99	100	100	145	420	410	97.6	40.2	-100	52	53	4.5	4.4	97.7	3.6	3.5	97.22	80	75	93.7	3.2	3	93.75	500
13	110	70	74	97	100	110	130	400	380	95	40.4	30	62	55	5.3	5.4	101.8	4.2	4	92.59	79.2	75	94.6	3.1	3	96.77	500
14	122	80	74	98	100	120	130	400	370	92.5	40.4	32	66	52	5.4	5.3	98.1	4.32	4	95.23	80	75	93.7	3	2.8	93.33	500
15	120	80	76	98	110	110	138	400	388	97	39.1	36	60	55	5.2	5.1	98	4.16	4	96.15	80	75	93.7	3	3	100	480

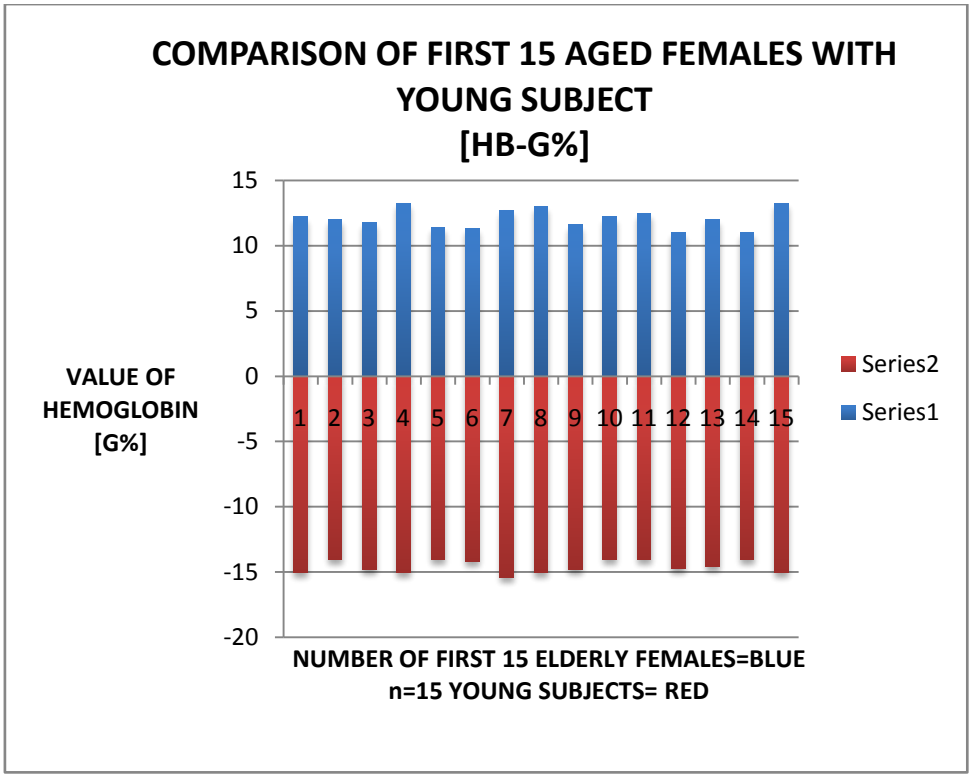
PHOTOGRAPHS

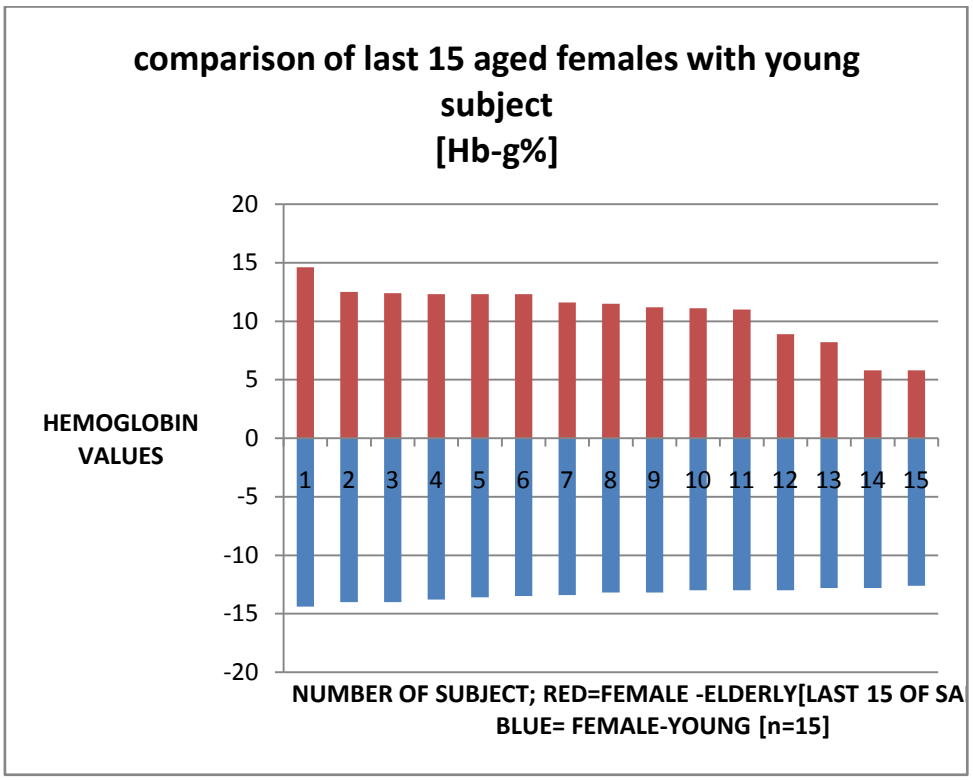

%SpO2 PRbpm
.93 89
PUSH
PULSE OXIMETER

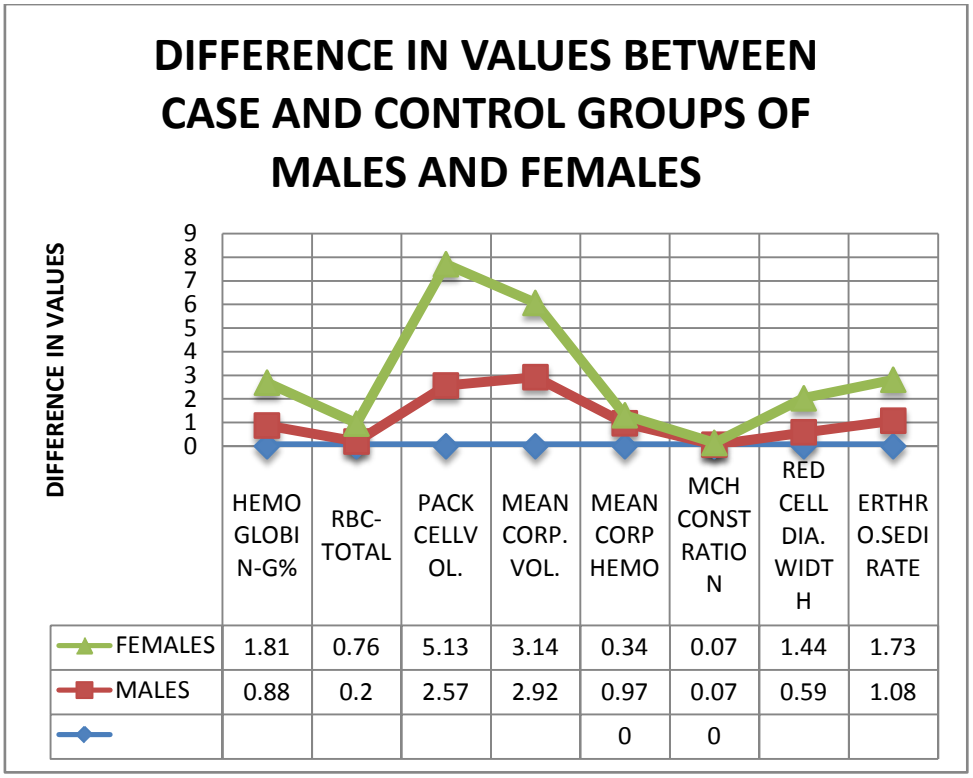


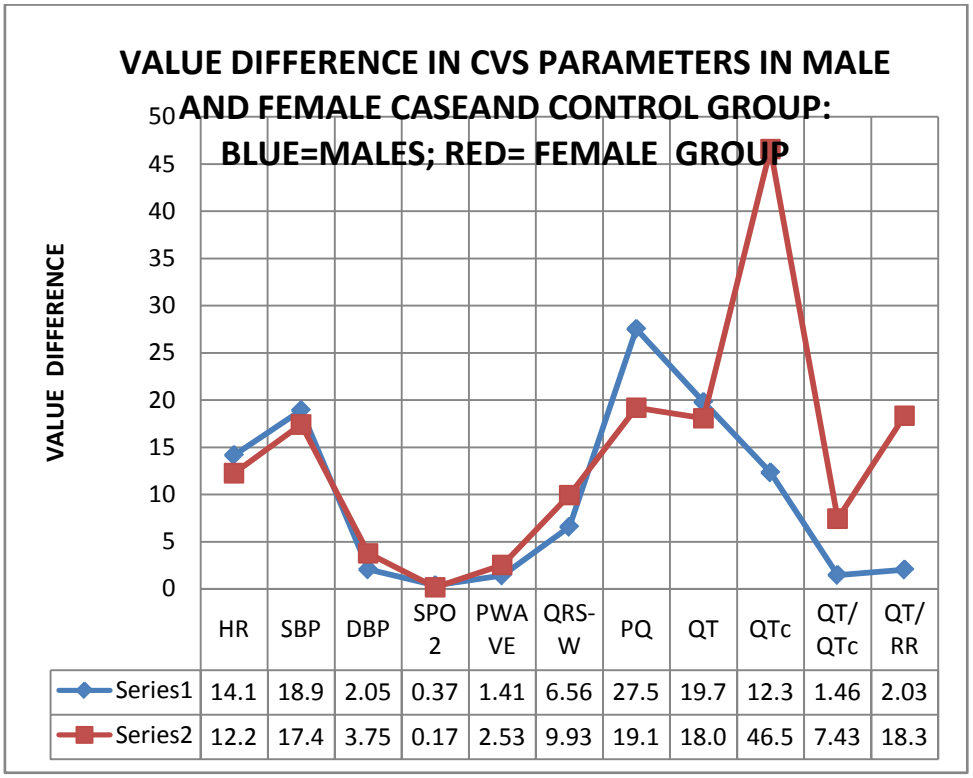


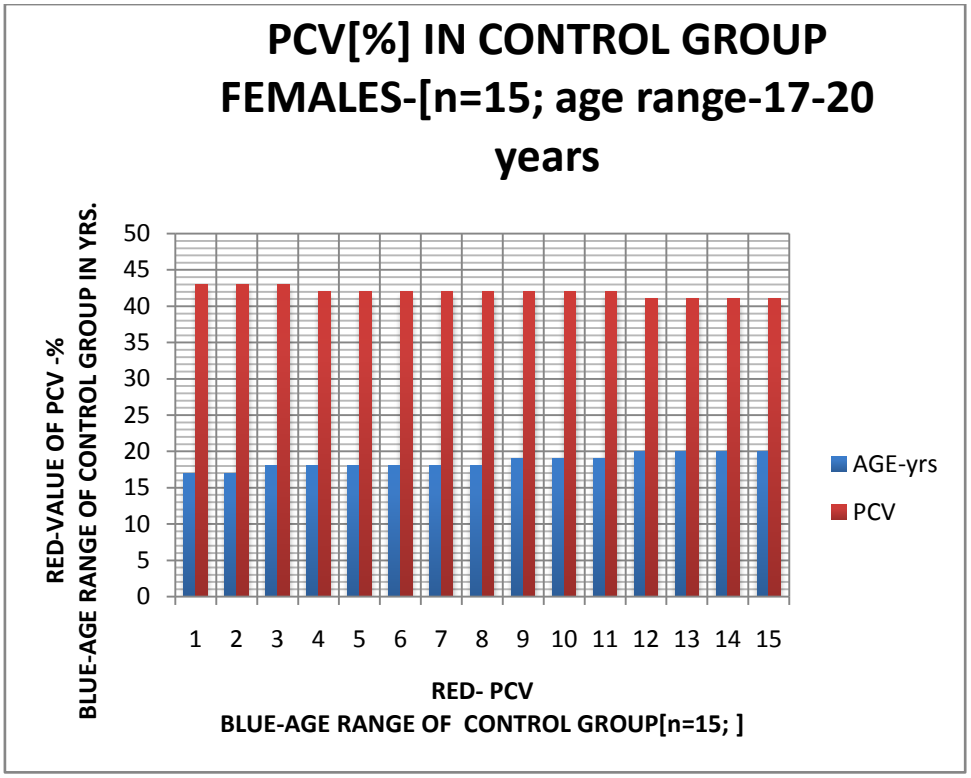

Clarity
ClarityMed ECG 50 - 1Ch
Start
Fn

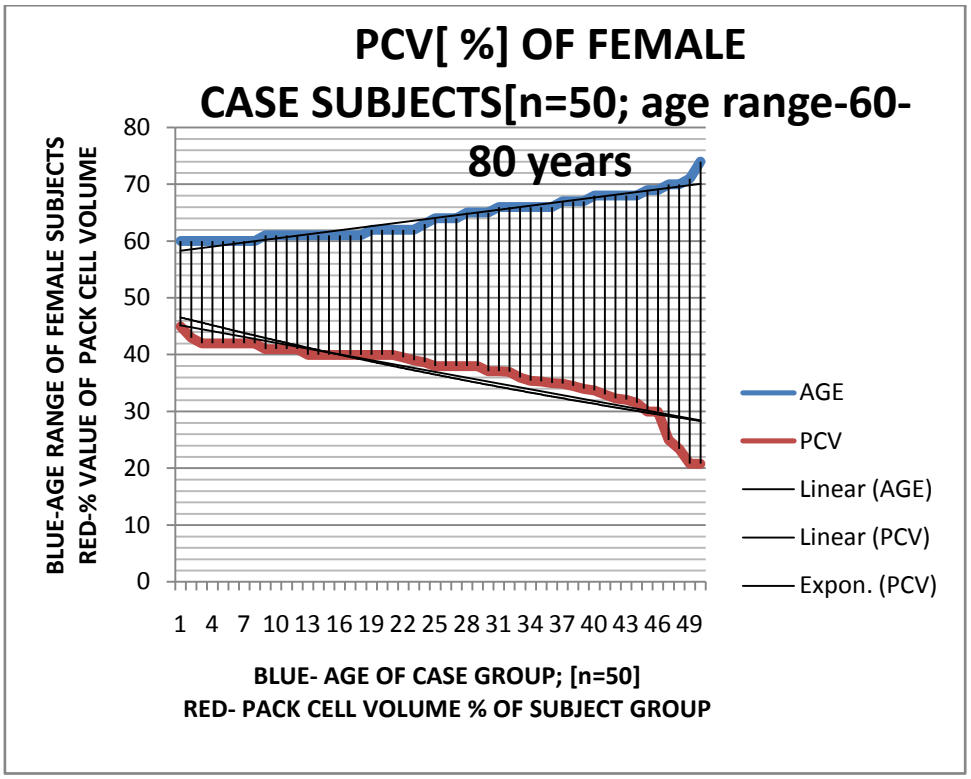

COMPARISON OF FIRST 15 AGED FEMALES WITH YOUNG SUBJECT
[HB-G%]
VALUE OF HEMOGLOBIN [G%]
15
10
5
0
-5
-10
-15
-20
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
Series2
Series1
NUMBER OF FIRST 15 ELDERLY FEMALES=BLUE
n=15 YOUNG SUBJECTS= RED

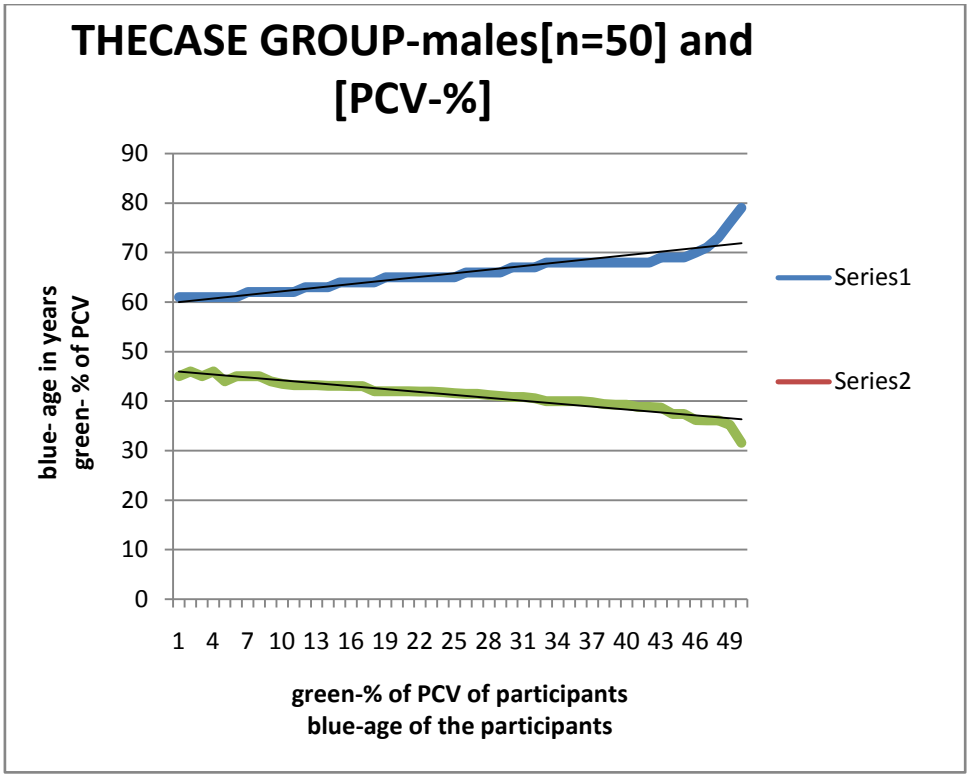

comparison of last 15 aged females with young subject
[Hb-g%]
HEMOGLOBIN VALUES
20
15
10
5
0
-5
-10
-15
-20
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
NUMBER OF SUBJECT; RED=FEMALE -ELDERLY[LAST 15 OF SA
BLUE= FEMALE-YOUNG [n=15]

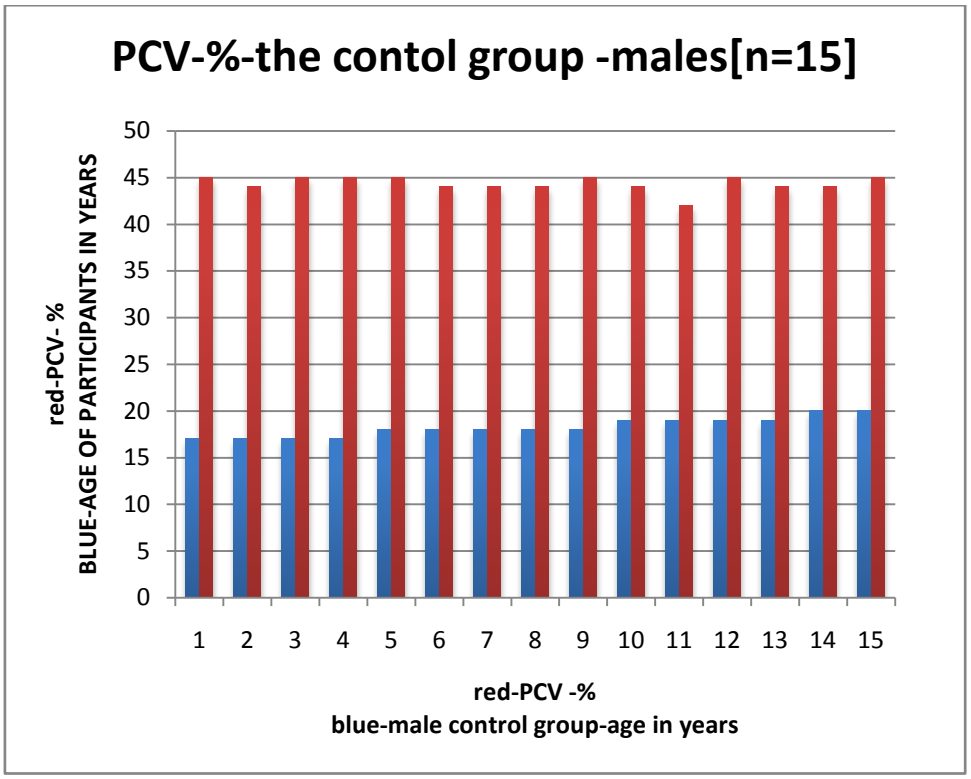

DIFFERENCE IN VALUES BETWEEN CASE AND CONTROL GROUPS OF MALES AND FEMALES
DIFFERENCE IN VALUES
9
8
7
6
5
4
3
2
1
0
HEMO GLOBIN-G%
RBC-TOTAL
PACK CELLVOL.
MEAN CORP. VOL.
MEAN CORP HEMO
MCH CONSTRATION
RED CELL DIA. WIDTH
ERTHRO.SEDI RATE
FEMALES 1.81 0.76 5.13 3.14 0.34 0.07 1.44 1.73
MALES 0.88 0.2 2.57 2.92 0.97 0.07 0.59 1.08
0 0

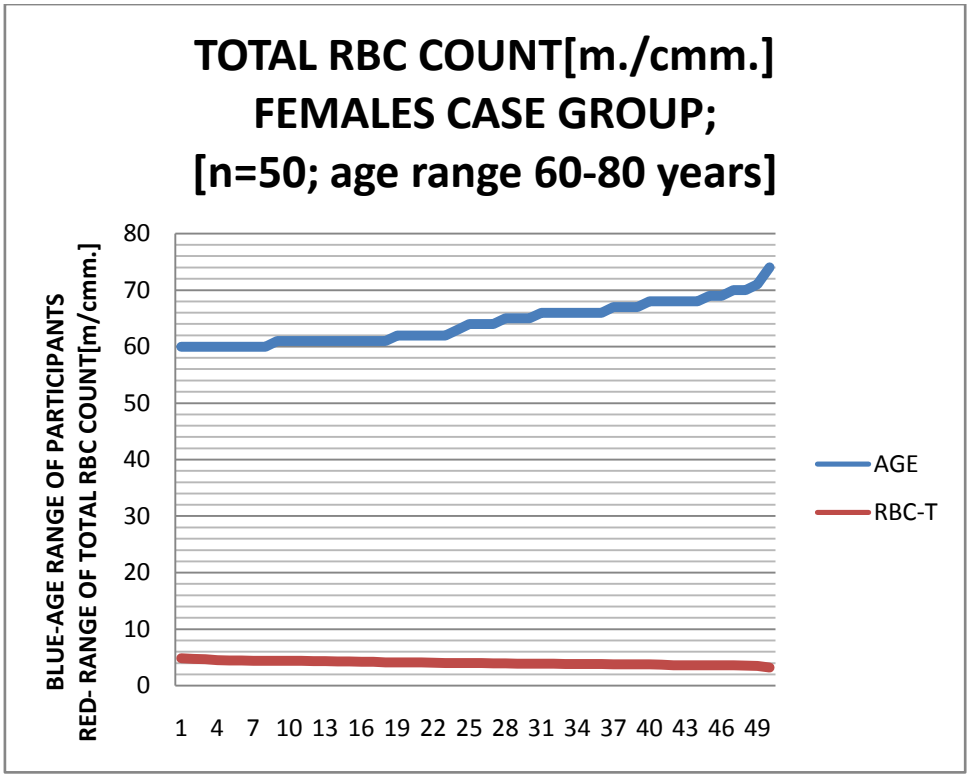

VALUE DIFFERENCE IN CVS PARAMETERS IN MALE AND FEMALE CASEAND CONTROL GROUP: BLUE=MALES; RED= FEMALE GROUP
VALUE DIFFERENCE
50
45
40
35
30
25
20
15
10
5
0
HR
SBP
DBP
SPO 2
PWA VE
QRS-W
PQ
QT
QTc
QT/ QTc
QT/ RR
Series1 14.1 18.9 2.05 0.37 1.41 6.56 27.5 19.7 12.3 1.46 2.03
Series2 12.2 17.4 3.75 0.17 2.53 9.93 19.1 18.0 46.5 7.43 18.3

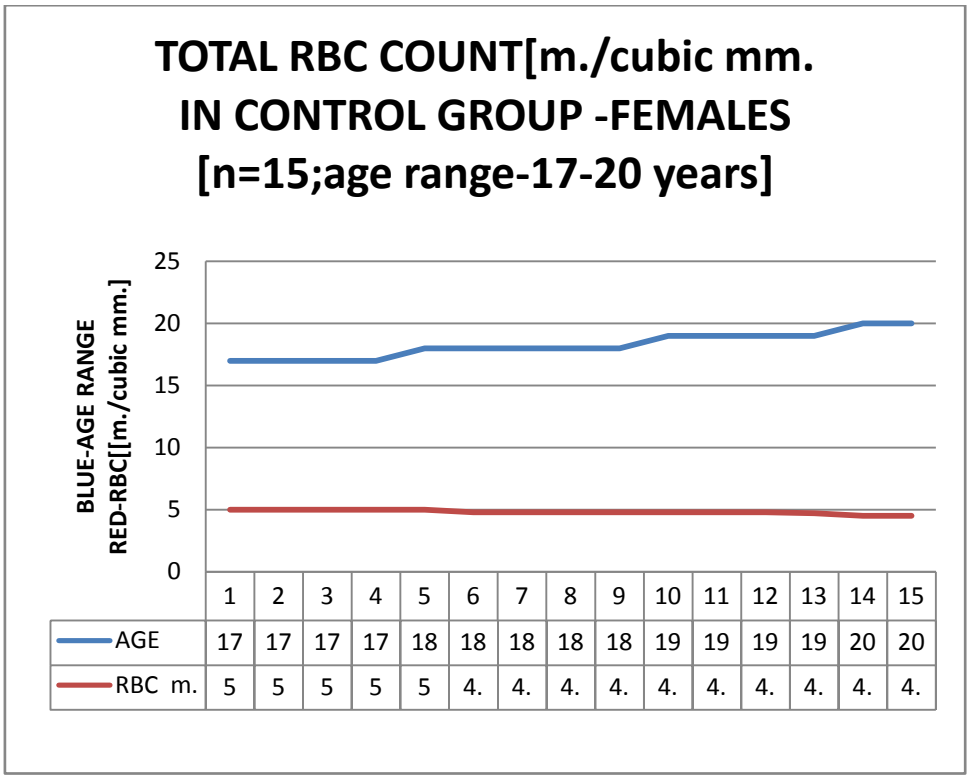

PCV[%] IN CONTROL GROUP FEMALES-[n=15; age range-17-20 years
RED-VALUE OF PCV -%
BLUE-AGE RANGE OF CONTROL GROUP IN YRS.
50
45
40
35
30
25
20
15
10
5
0
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
AGE-yrs
PCV
RED- PCV
BLUE-AGE RANGE OF CONTROL GROUP[n=15;]


PCV[%] OF FEMALE CASE SUBJECTS[n=50; age range-60-80 years
BLUE-AGE RANGE OF FEMALE SUBJECTS
RED-% VALUE OF PACK CELL VOLUME
80
70
60
50
40
30
20
10
0
1 4 7 10 13 16 19 22 25 28 31 34 37 40 43 46 49
AGE
PCV
Linear (AGE)
Linear (PCV)
Expon. (PCV)
BLUE- AGE OF CASE GROUP; [n=50]
RED- PACK CELL VOLUME % OF SUBJECT GROUP

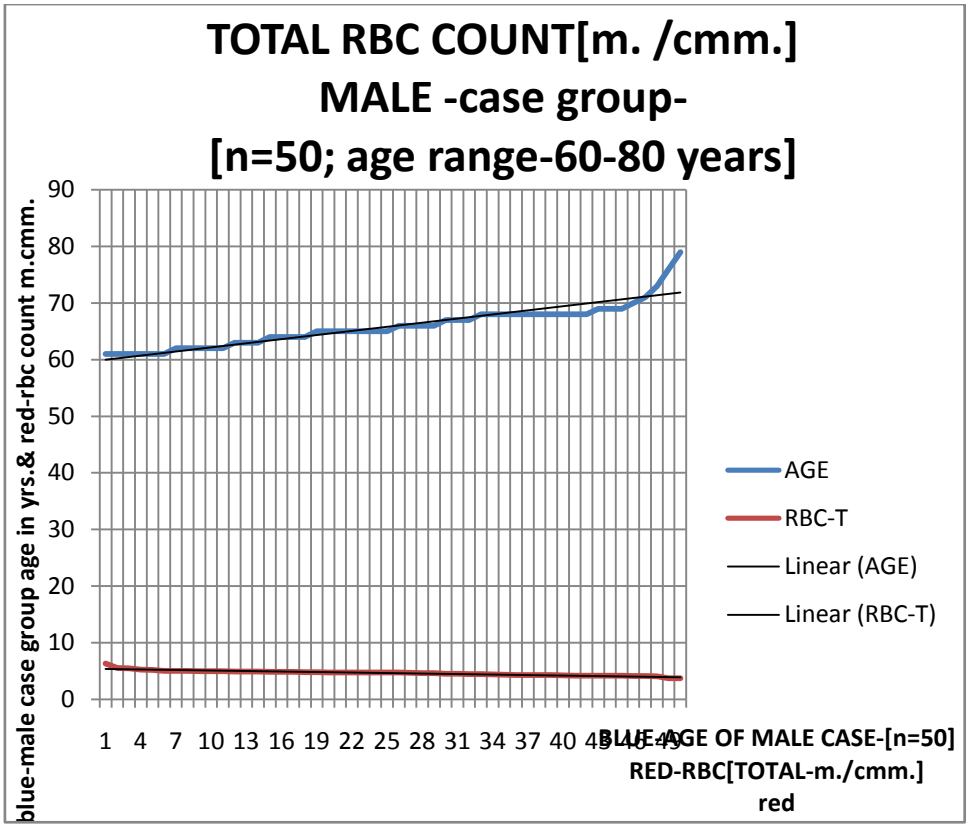

THECASE GROUP-males[n=50] and [PCV-%]
blue- age in years
green- % of PCV
90
80
70
60
50
40
30
20
10
0
1 4 7 10 13 16 19 22 25 28 31 34 37 40 43 46 49
Series1
Series2
green-% of PCV of participants
blue-age of the participants

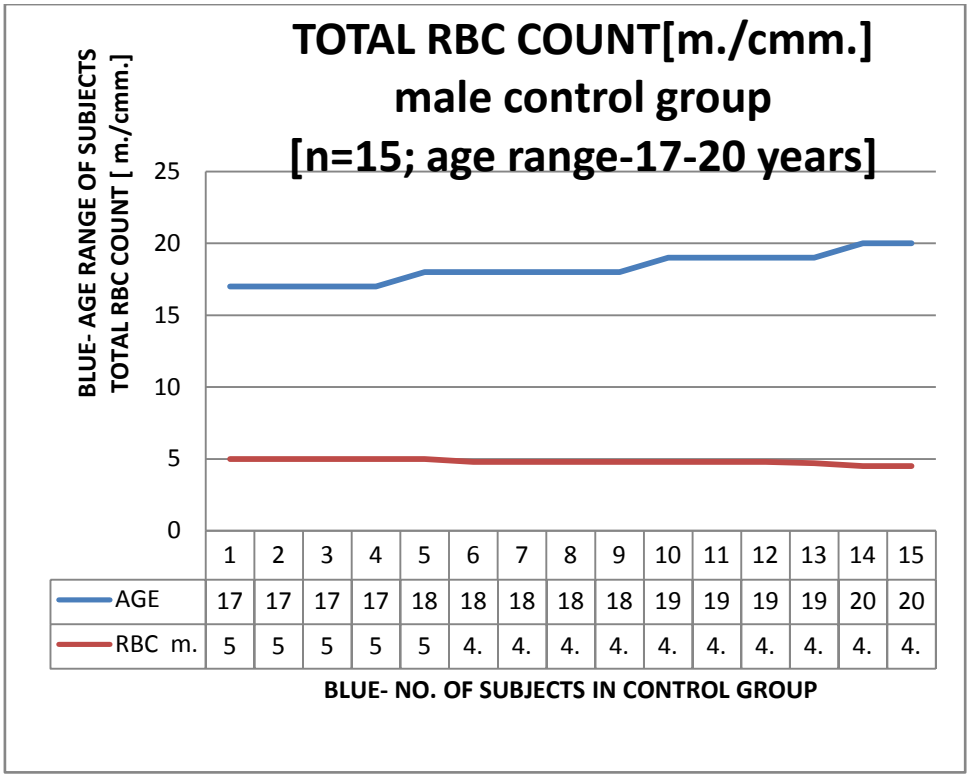

PCV-%-the contol group -males[n=15]
red-PCV- %
BLUE-AGE OF PARTICIPANTS IN YEARS
50
45
40
35
30
25
20
15
10
5
0
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
red-PCV -%
blue-male control group-age in years



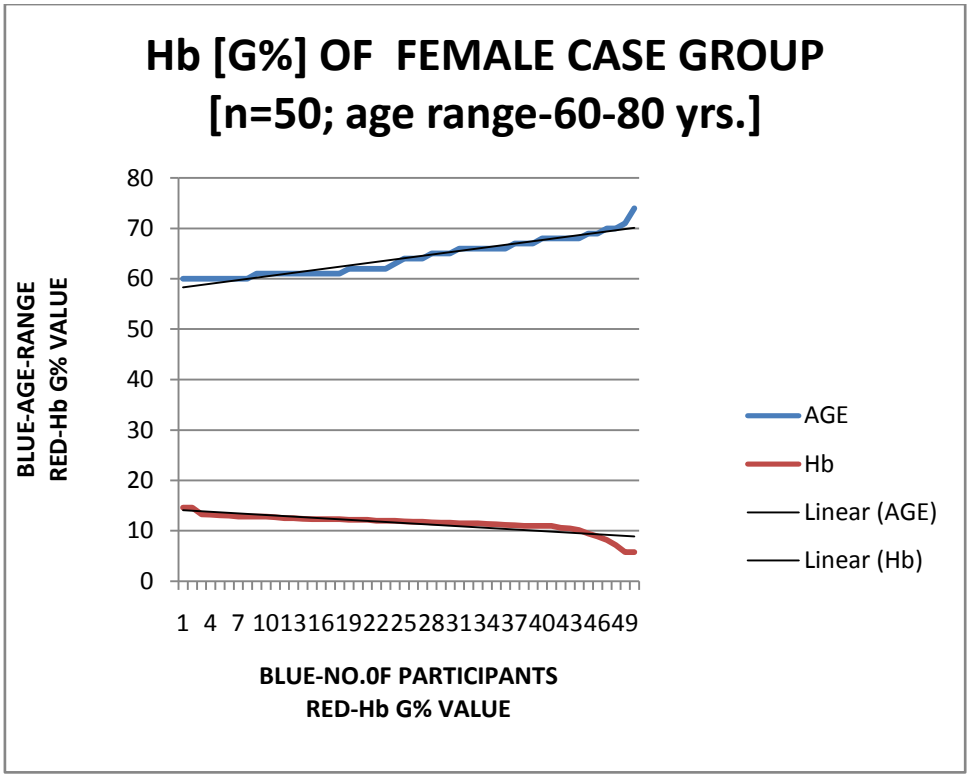


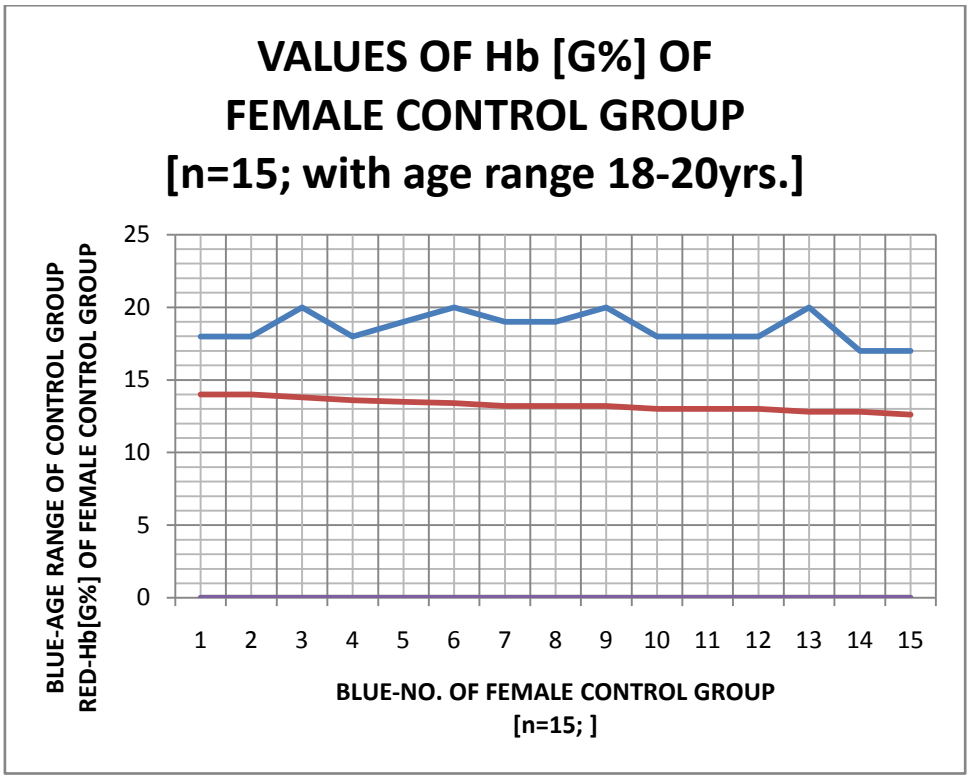
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
AGE	17	17	17	17	18	18	18	18	18	19	19	19	19	20	20
RBC m.	5	5	5	5	5	4.	4.	4.	4.	4.	4.	4.	4.	4.	4.

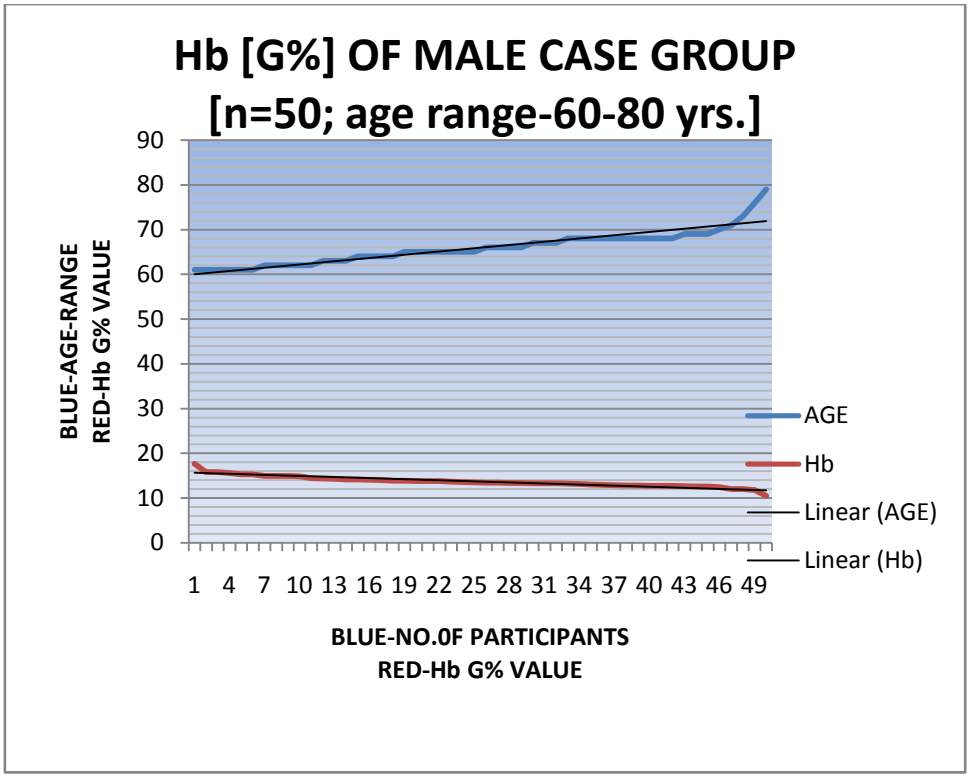


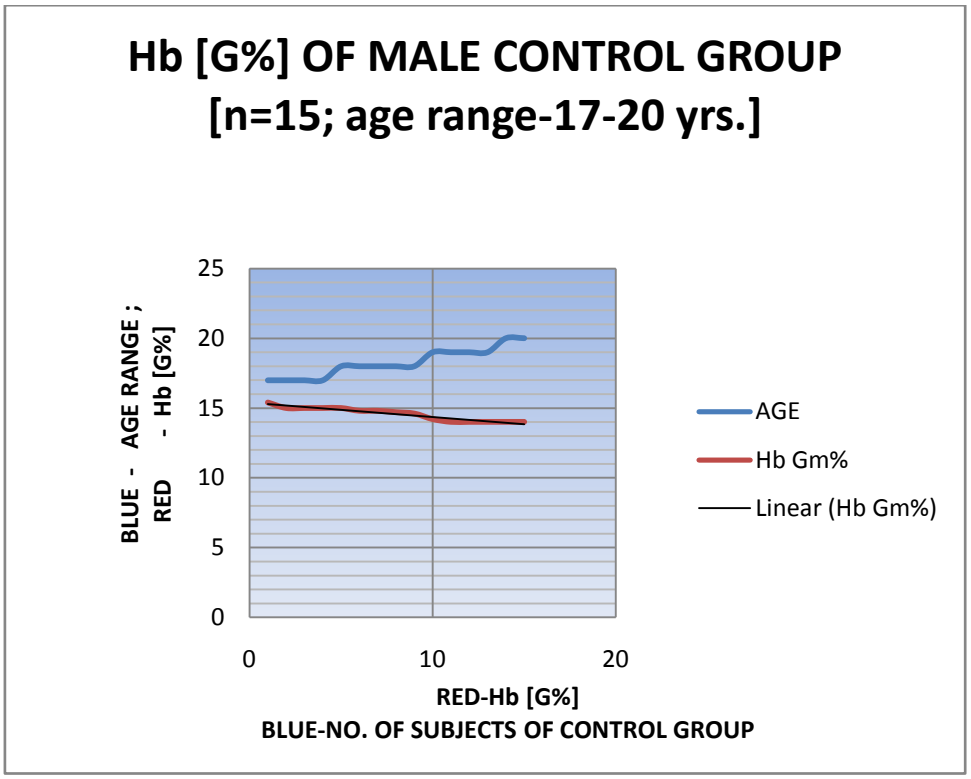


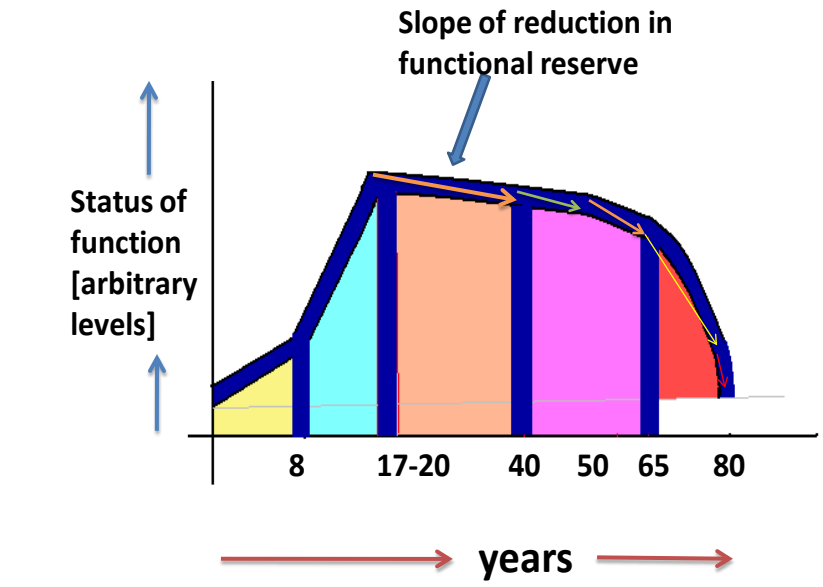
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
AGE	17	17	17	17	18	18	18	18	18	19	19	19	19	20	20
RBC m.	5	5	5	5	5	4.	4.	4.	4.	4.	4.	4.	4.	4.	4.

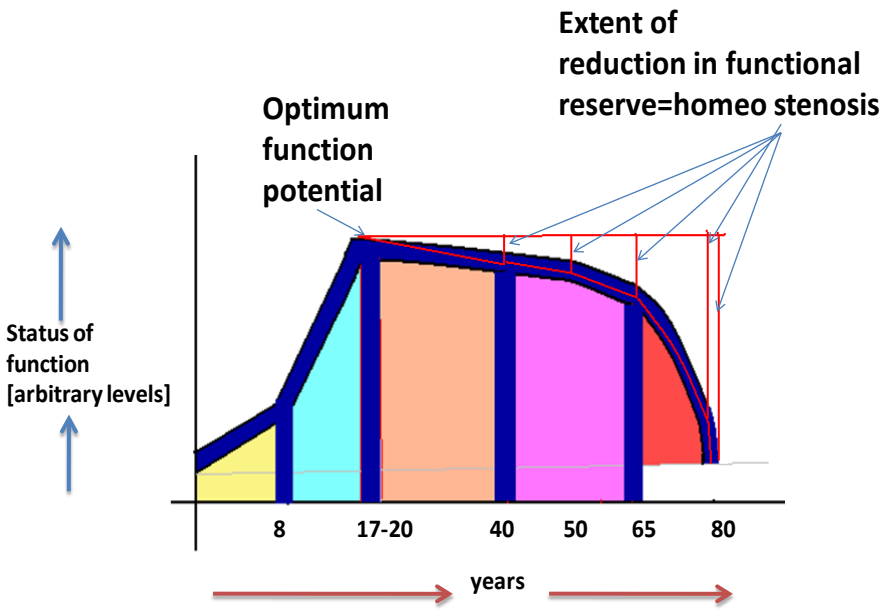

Hb [G%] OF FEMALE CASE GROUP
[n=50; age range-60-80 yrs.]
BLUE-AGE-RANGE
RED-Hb G% VALUE
80
70
60
50
40
30
20
10
0
1 4 7 10131619222528313437404346 49
AGE
Hb
Linear (AGE)
Linear (Hb)
BLUE-NO.0F PARTICIPANTS
RED-Hb G% VALUE


VALUES OF Hb [G%] OF
FEMALE CONTROL GROUP
[n=15; with age range 18-20yrs.]
BLUE-AGE RANGE OF CONTROL GROUP
RED-Hb[G%] OF FEMALE CONTROL GROUP
25
20
15
10
5
0
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
BLUE-NO. OF FEMALE CONTROL GROUP
[n=15;]


Hb [G%] OF MALE CASE GROUP
[n=50; age range-60-80 yrs.]
BLUE-AGE-RANGE
RED-Hb G% VALUE
90
80
70
60
50
40
30
20
10
0
1 4 7 10 13 16 19 22 25 28 31 34 37 40 43 46 49
AGE
Hb
Linear (AGE)
Linear (Hb)
BLUE-NO.0F PARTICIPANTS
RED-Hb G% VALUE


Hb [G%] OF MALE CONTROL GROUP
[n=15; age range-17-20 yrs.]
BLUE - AGE RANGE ;
RED - Hb [G%]
25
20
15
10
5
0
0
10
20
AGE
Hb Gm%
Linear (Hb Gm%)
RED-Hb [G%]
BLUE-NO. OF SUBJECTS OF CONTROL GROUP





Proposed schematic diagram of degree of homeostenosis in aged person

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ANNEXURE

PARTICIPANT INFORMATION SHEET

Title of the study: **STUDY OF HEMATOLOGICAL AND CARDIO RESPIRATORY PARAMETERS DURING HOMOEOSTENOSIS IN SENIOR CITIZENS OF VADODARA CITY.**

Study no: …….. Date: ……

Invitation to participant:

***Purpose & nature of the study:**

It is a Prospective study. The purpose of the study is to compare determine the homoeostenosis by assessment of hematologic and cardio-respiratory parameters in senior citizens of Vadodara city.

***Voluntary nature of the participation:**

The study is absolutely voluntary in nature; participants can participate in this study willingly after understanding about the study.

***Study methods:**

In this study, interrogation of participants and examination of anthropometric hematologic and cardio-respiratory parameters. It is one stage mixed, qualitative and quantitative assessment.

***Participants responsibilities:**

We need consent for the procedure from the patient.

***Expected adverse events, risks and solution:**

There practically no risk or adverse reaction as no medication or invasive procedure is undertaken.

***The benefits of participation:**

The participants realizes Existence and Extent of diminishing reserves of cardio vascular and respiratory systems and blood, and because of the knowledge of diminishing reserves of these, he can live life within known and safe limits and can have prolonged expectancy of life.

***Confidentiality of the record:**

During the study all data that is collected will be confidential and patients' privacy will be maintained.

***If any problem develops, you can contact:**

NAME: Dr. Upendrakumar I. Bhatt: 9904840340

ADDRESS: Asst. Prof. Physiology, Dept. SBKS MI & RC, Piparia, Sumandeep Vidhyapeeth.

***Financial considerations:**

No extra expense will be9 borne by the participants. Nothing in cash or kind will taken from participants. I will not charge any money for this study from the participants.

***Protection for patient and security:**

Patients' data and records collected will be kept confidential and secured.

***Obtaining additional information:**

Any query regarding the study can be cleared by meeting Dr. J.M. Harsoda, Guide, and Prof. & HOD, Physiology Department, SBKS MI & RC, Piparia, Sumandeep Vidyapeeth.

Sumandeep Vidyapeeth University

Piparia, Ta. Waghodia, Dist. Vadodara. Pin 391760

Informed Consent Form (ICF) for Participants in Research Programmes involving studies on human beings

Study title **STUDY OF HEMATOLOGICAL AND CARDIO RESPIRATORY PARAMETERS DURING HOMOEOSTENOSIS IN SENIOR CITIZENS OF VADODARA CITY.**

Study no: …….. Date: ……

Participants Initials:

Participant's Name

Date of Birth / Age _____ (Years)

1. I confirm that I have read and understood the information sheet dated _____ for the above study and have had the opportunity to ask questions. [ ]

2. I understand that my participation in the study is voluntary and that I am free to withdraw at any time, without giving any reason, without my medical care or legal rights being affected. [ ]

3. I understand that the investigator of this study, others working on the investigator's behalf, the Ethics Committee and the regulatory authorities will not need my permission to look at my health records, both in respect of the current study and any further research that may be conducted in relation to it, even if I withdraw from the study. I agree to this access. However, I understand that my

identity will not be revealed in any information related to third party or published. [ ]

4. I agree not to restrict the use of any data or results that arise

5. From this study provided such a use is only for scientific purpose(s). [ ]

6. I agree to take part in the above study. [ ]

Signature (or thumb impression) of the participants /

Legally acceptable representative _____

Signatory's Name _____

Date _____

Signature of the investigator _____

Date _____

Study Investigator's Name _____

Signature of the impartial witness _____

Date _____

Name of the witness _____

Performa For Examination

Name….. Doctor…… Study Date…….

Consent ☐ Given ☐ Not Given…….Religion…….

Age….. Height….. Weight……. SFT…… BMI……

Sex…☐

Address……

……

Occupation……. Physical Activity…….. Exercise……1/2/3 [A Wk]./Daily

Diet… ☐ Veg ./ ☐ Non Veg. ☐ Mixed

Stay In Vadodara…… ☐ Yrs.

General Health…….Any Major Illness in Past……..Time…… Treated/N.T…… Out Come……

Any Present Illness / Treatment at Present……./

Any Disturbance of Blood/ Heart/ Respiration in Past/ Present?.....

Details:…….

……..

……..

Any Major Hospitalization/ Oprn./ Drugs/ Treatment by Artificial Devices in Chest?.....

Details of the same: When, ……Where……
Outcome……..

Past Illness/ S/S Of……..Bleeding …….

Relevant to CVS……

Relevant to
R.S……

Any Prosthetic Device or Medicine taken…Yes……No……

Any Family History of any Deemed Important Condition……

Personal History: Diet…. Bowel… Mict….Sleep…. Appetite….Chest Pain/ Cough/ Sputum Breathless Ness/ Air Hunger/ Libido/ Thirst.

Drug Allergy…… Vaccination…… H/O Blood
transfusion……

Head To Foot Exam;

Skin – Temp. & Colour ;….

Eyes-Conjunctivae-Cataract-Vessels-Iop

M.Memb.-Nails-Extremities-

F/O… Hypertension/ Diabetes/ Chr. Inf./

Neurol.Str./ Cynosis / Oedema / Jaundice / Lymph Nodes…/

General Examination- Vital –Consc…….Co-Op……..Built…….. Nut……

T…… .P……..…… Resp
…….B.P…….

Spo2…… Hr……..Pulse Wave…….

Any Investigation Undergone……

Blood Exam Results:……

Hb……Rbc[Total]…….. Pcv……

Mch……..Mchc……Mcv……..Rdw…….Esr……..Wbctotal]…….

D.C…….P……..L…….E……..M…….B……..Plt.Cnt……

Any Other Investigation Advised……..

Cvs Exam ; Resting Hr…….. B.P…….Spo2…….Radial Pulse Exam……..

ECG:A] Bipolar

LI……...LII…….LIII……

B] Augmented Leads

aVL……aVR…….aVF……

C] Unipolar Chest Leads

V1……..V2……V3…….V4……..V5……..V6……..

Waves: P…… QRS…… T……. QT Seg. …..QTc……..QT/QTc%.....QT/R-R%.....

Axis……P……..Axis……QRS……..Axis……T……..

Respi. FVC…../……Mean……... %Pred……

FEV1%..... Mean……. % Pred……

FEV1/FVC…….Mean…….% Pred……..

PEFR……Mean……. Pred……

Spo2…….

FEF25-75…….. Mean …….% Pred……..