"IMPORTANCE OF DIET AND EXERCISE TO MAINTAIN BODY COMPOSITION -A DATA COLLECTION STUDY"

PROJECT WORK SUBMITTED TO DEPARTMENT OF PG STUDIES IN FOOD SCIENCE AND NUTRITION, BESANT WOMEN'S COLLEGE, MANGALORE

IN THE PARTIAL FULFILMENT OF REQUIREMENT FOR THE AWARD OF THE DEGREE OF MASTER OF SCIENCE IN FOOD SCIENCE AND NUTRITION

Submitted By,

SOUMYA.NV

Reg.no:193041965

Department of PG Studies in Food Science and Nutrition, Women's College, M.G. Road, Kodialbail, Mangalore -575003

October 2021

CERTIFICATE

This is to certify that the project work entitled **"IMPORTANCE OF DIET AND EXERCISE TO MAINTAIN BODY COMPOSITION -A DATA COLLECTION STUDY"** is an authentic record of independent research work done by **Ms. SOUMYA. (Reg. no 193041965)**under my supervision during the period of **july 2021 to September 2021**, submitted to Mangalore university for the partial fulfilment for the award of the degree of **Master Of Science In Food Science And Nutrition** and the present work has not been previously formed the basis for the award of degree, diploma, fellowship, associateship or other titles.

Place: MANGALORE

DATE: 30 OCTOBER 2021

RESEARCH GUIDE

Ms. Asiyamath shahda firhat

M.Sc, Net

Assistant professor

Department Of PG Studies in Food Science and Nutrition

Besant Women's College

M.G. Road, Kodialbail

Mangalore 575003

Contact No: 8289905313

CERTIFICATE

This is to certify that the project work entitled *" IMPORTANCE OF DIET AND EXERCISE TO MAINTAIN BODY COMPOSITION -A DATA COLLECTION STUDY ",* submitted to the *Department of PG Studies in Food Science and Nutrition,* by *Ms. SOUMYA.NV (Reg. no 193041965)* towards the partial fulfilment of the degree of *Master of Science inFood Science and Nutrition,* is a faithful record of original work carried out by her in the academic year **2019-2021**

Place: MANGALORE

DATE: 30 October 2021

HEAD OF THE DEPARTMENT

EXAMINERS:

1.

2.

DECLARATION

I, *SOUMYA.NV.,* hereby declare that project work entitled **"IMPORTANCE OF DIET AND EXERCISE TO MAINTAIN BODY COMPOSITION -A DATA COLLECTION STUDY "** is a bona fide record of research work done by me under the supervision of **Ms. Asiyamath shahda firhath, Department of PG Studies in Food Science and Nutrition, Besant Women's College, Mangalore.**

The information depicted in the current report is the result of my own work on my clients since I am in the post of fitness nutritionist at zuese fitness club, except where the reference is made. The information provided in the report is authentic as per my knowledge.

The results embodied in the project work have not been submitted to any other university or institution for the award of any degree, diploma, associateship, fellowship or similar titles.

Place: MANGALORE

Date: 30 OCTOBER 2021

SOUMYA.NV

ACKNOWLEDGEMENT

The following project work became reality with the kind support and help of many individuals and I would extend my hearty thanks to each one of them.

First, I would like to express my sincere gratitude to **Ms. Asiyamath shahda firhath** , my guide Department of PG Studies Food Science and Nutrition, Besant Women's College, for her constant guidance, support, encouragement, and patience.

I owe my sincere thanks to zuese fitness club management and all the staffs for giving me a opportunity to work as their fitness nutritionist .Those experience gives me lots of courage to do this project ,and also I am thankful to my clients for their dedication , consistency towards the fitness goal .It's helps me to proceed this project work because of their good results .

It gives me immense pleasure to thank our respectedd principal, *Dr. Satish Shetty P.*, Besant Women's College, Mangalore, for his constant support and encouragement in my endeavours.

I would like to thank my lecturers, **Ms. Shwetha singh, Dr. Asha rai , Ms. Indira badya,** and *Ms. Roopa Rao K,* for their recommendations and valuable inputs from time to time.

I am thankful to my friends *Manikanta, likhith, shravya, Nilofer, Amna, Ameera, Afeefa,* and *sachitha* for their considerate suggestions .

Finally, my biggest thanks to my mother **V. Baby** and my brother *Sajith.nv* who set me off on the road to this M.Sc. degree. They have supported me positively and boosted my morale at every step of the way. I am indebted to them for their continuous and assistance in any way they could throughout the project.

Place: Mangalore

Date: OCTOBER 2020

CONTENTS

INTRODUCTION TO ZUESE FITNESS CLUB

Zuese Fitness Club is the leading and biggest fitness centre in Mangaluru. Zuese Fitness Club has experience of a decade in the fitness industry, established on June 5th 2010. Starting with a humble beginning by opening a small branch which employed only 5 people at PVS circle, Mangaluru. Today Zuese Fitness Club has grown into mangluru's leading fitness chain employing more than 100 people and having 4 branches currently.

Zeuse Fitness Club offers Club facilities, Cardio area, Strength area, Personal Training, Yoga, MMA, Functional Fitness Classes, Physiotherapy, Nutritionist, Massage facility. We also provide facilities like a Locker room, steam facilities, hot shower and toilets. We are pioneers in giving best in class gym facilities in Managluru.

We have international standard met fitness equipments, which enhances the performance of trainers/clients. Our trainers are well trained and undergo training periodically so that we learn new techniques and learn more about fitness trends. Our trainers have weekly meeting and workshops where they find solutions to modern age fitness problems. We also take care of rehab activity with our physiotherapy team and help our clients to recover quickly. We care about our client's nutritional activities which directly affects the clients desired goals, hence we have Nutritionist in our gym.

We mainly focus on our community building, we try to expose fitness to the community. We keep conducting social activites so more people get aware of fitness. We conduct weekly beach workout and other important workshop related to lifestyle and fitness. So more people care about Fitness in their lives.

INTRODUCTION:-

Body mass index (BMI) is a calculation that takes a person's weight and height into account to measure body size.In adults, obesity is defined as having a BMI of 30.0 or moreTrusted Source, according to the Centers for Disease Control and Obesity is associated with a higher risk for serious diseases, such as type 2 diabetes, heart disease, and cancer.Obesity is common. The CDC estimates that 42.4 percentTrusted Source of Americans 20 years old and older had obesity in 2017 to 2018.But BMI isn't everything. It has some limitations as a metric.According to the CDCTrusted Source: "Factors such as age, sex, ethnicity, and muscle mass can influence the relationship between BMI and body fat. Also, BMI doesn't distinguish between excess fat, muscle, or bone mass, nor does it provide any indication of the distribution of fat among individuals."

"calories in versus calories out." This has more imprtance to maintain body healthily.This concept is based on the idea that as long as you eat fewer calories than you burn, you're bound to lose weight.However, some people insist that the type of food you eat matters much more than the number of calories it contains — both in terms of weight loss and long-term health.This article investigates whether the "calories in versus calories out" model really matters.The "calories in versus calories out" model is based on the idea that to maintain a stable weight, the number of calories you eat needs to match the number you expend.

"Calories in" refers to the calories you get from the foods you eat, while "calories out" is the number of calories you burn.

There are three main bodily processes that burn calories:

- **Basic metabolism.** Your body uses most of the calories you get from food to sustain basic functions, such as your heartbeat. This is commonly referred to as your basal metabolic rate (BMR) .

- **Digestion.** Around 10–15% of the calories you eat is used to power digestion. This is known as the thermic effect of food (TEF) and varies based on the foods you eat.

- **Physical activity.** The leftover calories you get from your diet are meant to fuel your physical activity, including workouts and everyday tasks like walking, reading, and washing dishes.

When the number of calories you take in from food matches the number of calories you burn to sustain your metabolism, digestion, and physical activity, your weight will remain stable.Thus, the "calories in versus calories out" model is strictly true. You need a to lose weight.

From a biological perspective, you need to eat fewer calories than you burn to lose weight. There's no way around it.Once your body's energy needs are met, extra calories are stored for future use — some in your muscles as glycogen, but most as fat. Thus, eating more calories than you burn will cause you to gain weight, whereas eating fewer than you need will cause weight loss .Some studies make it appear as if *what* you eat matters more than *how much* you eat, implying that the calorie content of your diet is irrelevant for weight loss. However, these studies are based on a few incorrect assumptions .For instance, those who insist that low-carb diets help people lose more weight despite eating the same number of (or even more) calories, often rely on diet journals to estimate calorie intake.The problem is that diet journals are notoriously inaccurate, even when filled out by nutrition professionals .What's more, some studies only report the total amount of weight lost, without mentioning whether the weight loss came from muscle, fat, or water losses.Different diets affect muscle and water losses differently, which can make it seem as if they are more effective for fat loss when this isn't truly the case .Studies controlling for these factors consistently show that weight loss always results from a calorie deficit. This is true regardless of whether your calories come from carbs, fat, or protein.

While the "calories in versus calories out" model matters for weight loss, not all calories are created equal when it comes to your health.That's because different foods have different effects on various processes in your body, regardless of calorie contents.The source of calories impacts your hormones and health differentlyDifferent foods can affect your hormone levels in different ways.The differing effects of glucose and fructose serve as a good example. These two simple sugars provide the same number of calories per gram, but your body metabolizes them in completely different ways .A diet too rich in added fructose is linked to insulin resistance, increased blood sugar levels, and higher

triglyceride and LDL (bad) cholesterol levels than a diet providing the same number of calories from glucose .That said, fruit, which contains natural fructose along with fiber and water, does not have the same negative effects.What's more, the type of fat present in your diet can have different effects on your reproductive hormone levels. For instance, diets rich in polyunsaturated fats appear to boost fertility in healthy women .What's more, replacing saturated fats with unsaturated fats in your diet may further lower your risk of heart disease, even though both types provide the same number of calories per gram .

The types of food you eat affect how full you feel:-

Your nutrient intake impacts your hunger and feelings of fullness.For instance, eating a 100-calorie serving of beans will reduce your hunger much more effectively than eating a 100-calorie serving of candy.That's because foods rich in protein or fiber are more filling than foods containing lower amounts of these nutrients .The candy, which is low in fiber and protein, is much more likely to lead you to overeat later in the day, reducing the likelihood that your "calories in" will match your "calories out."Similarly, fructose tends to increase levels of the hunger hormone ghrelin more than glucose does.It also doesn't stimulate the fullness centers in your brain in the same way as glucose, so you won't feel as full after eating fructose as you would after eating glucose .This is why most processed foods that are rich in fructose but devoid of protein or fiber generally make it more difficult for you to maintain an energy balance.

The source of calories has different effects on your metabolism:-

Foods affect your metabolism differently. For instance, some require more work to digest, absorb, or metabolize than others. The measure used to quantify this work is called the thermic effect of food (TEF).The higher the TEF, the more energy a food requires to bemetabolized. Protein has the highest TEF, while fat has the lowest. This means that a high-protein diet requires more calories to be metabolized than a lower-protein diet doe. This is why eating protein is often said to boost your metabolism to a greater extent than eating carbs or fat. That said, when it comes to weight loss, the TEF of foods appears to have only a small effect on your calorie balance .

Why nutrient density mattersThe amount of nutrients a food contains per calorie can vary greatly.Nutrient-dense foods provide higher amounts of vitamins, minerals, and beneficial compounds per gram compared with less nutrient-dense foods.For instance, fruits are

much more nutrient-dense than donuts. Calorie for calorie, fruit will provide a much larger dose of vitamins, minerals, and beneficial plant compounds.Other examples of nutrient-dense foods include vegetables, whole grains, legumes, meat, fish, poultry, dairy products, and unsalted nuts and seeds.On the other hand, processed foods, including white pasta, soda, cookies, chips, ice cream, and alcohol are considered to have a low nutrient density.Diets rich in nutrient-dense foods are consistently linked to a lower risk of chronic diseases, such as diabetes and heart disease, and may even help you live longer .The "calories in versus calories out" model fails to take nutrient density into account, which is a good reason to doubt its relevance when it comes to your health.From a strictly biological perspective, the "calories in versus calories out" model matters for weight loss.You will only lose weight if you consume fewer calories than you burn, regardless of the types of food you eat.However, this model fails to take nutrient density into account, which is highly relevant to your health. Moreover, different foods can impact your hormones, metabolism, hunger, and feelings of fullness differently, in turn influencing your calorie intake.Practically speaking, some foods can make it easier for you to remain at a healthy weight, all while optimizing your overall health. Focusing solely on calories may cause you to miss the big picture.

Obesity results from energy imbalance: too many calories in, too few calories burned. A number of factors influence how many calories (or how much "energy") people burn each day, among them, age, body size, and genes. But the most variable factor-and the most easily modified-is the amount of activity people get each day.Keeping active can help people stay at a healthy weight or lose weight. It can also lower the risk of heart disease, diabetes, stroke, high blood pressure, osteoporosis, and certain cancers, as well as reduce stress and boost mood. Inactive (sedentary) lifestyles do just the opposite.Despite all the health benefits of physical activity, people worldwide are doing less of it-at work, at home, and as they travel from place to place. Globally, about one in three people gets little, if any, physical activity. (1) Physical activity levels are declining not only in wealthy countries, such as the U.S., but also in low- and middle-income countries, such as China. And it's clear that this decline in physical activity is a key contributor to the global obesity epidemic, and in turn, to rising rates of chronic disease everywhere.The World Health Organization, the U.S. Dept. of Health and Human Services, and other authorities recommend that for good health, adults should get the equivalent of two and a half hours of moderate-to-vigorous physical activity each week. (2–4) Children should get even

more, at least one hour a day. There's been some debate among researchers, however, about just how much activity people need each day to maintain a healthy weight or to help with weight loss, and the most recent studies suggest that a total of two and a half hours a week is simply not enough.This article defines physical activity and explains how it is measured, reviews physical activity trends, and discusses the role of physical activity in weight control.

Though people often use physical activity and exercise interchangeably, the terms have different definitions. "Physical activity" refers to any body movement that burns calories, whether it's for work or play, daily chores, or the daily commute. "Exercise," a subcategory of physical activity, refers to -planned, structured, and repetitive- activities aimed at improving physical fitness and health. (5) Researchers sometimes use the terms "leisure-time physical activity" or "recreational physical activity" as synonyms for exercise.Experts measure the intensity of physical activity in metabolic equivalents or METs. One MET is defined as the calories burned while an individual sits quietly for one minute. For the average adult, this is about one calorie per every 2.2 pounds of body weight per hour; someone who weighs 160 pounds would burn approximately 70 calories an hour while sitting or sleeping. Moderate-intensity physical activity is defined as activities that are strenuous enough to burn three to six times as much energy per minute as an individual would burn when sitting quietly, or 3 to 6 METs. Vigorous-intensity activities burn more than 6 METs.It is challenging for researchers to accurately measure people's usual physical activity, since most studies rely on participants' reports of their own activity in a survey or daily log. This method is not entirely reliable: Studies that measure physical activity more objectively, using special motion sensors (called accelerometers), suggest that people tend to overestimate their own levels of activity.

Researchers believe that physical activity prevents obesity in multiple ways:

- Physical activity increases people's total energy expenditure, which can help them stay in energy balance or even lose weight, as long as they don't eat more to compensate for the extra calories they burn.

- Physical activity decreases fat around the waist and total body fat, slowing the development of abdominal obesity.

- Weight lifting, push-ups, and other muscle-strengthening activities build muscle mass, increasing the energy that the body burns throughout the day-even when it's at rest-and making it easier to control weight.

- Physical activity reduces depression and anxiety, and this mood boost may motivate people to stick with their exercise regimens over time.

Being moderately active for at least 30 minutes a day on most days of the week can help lower the risk of chronic disease. But to stay at a healthy weight, or to lose weight, most people will need more physical activity-at least an hour a day-to counteract the effects of increasingly sedentary lifestyles, as well as the strong societal influences that encourage overeating.Keep in mind that staying active is not purely an individual choice: The so-called "built environment"-buildings, neighborhoods, transportation systems, and other human-made elements of the landscape-influences how active people are. (25) People are more prone to be active, for example, if they live near parks or playgrounds, in neighborhoods with sidewalks or bike paths, or close enough to work, school, or shopping to safely travel by bike or on foot. People are less likely to be active if they live in sprawling suburbs designed for driving or in neighborhoods without recreation opportunities.Local and state governments wield several policy tools for shaping people's physical surroundings, such as planning, zoning, and other regulations, as well as setting budget priorities for transportation and infrastructure. (27) Strategies to create safe, active environments include curbing traffic to make walking and cycling safer, building schools and shops within walking distance of neighborhoods, and improving public transportation, to name a few. Such changes are essential to make physical activity an integral and natural part of people's everyday lives-and ultimately, to turn around the obesity epidemic.

In this project work iam using BCA machine to check body composition ,ie TANITA MACHINE.Tanita monitors bring you fast, accurate body composition results using the latest advanced bio-electrical impedance analysis (BIA) technology first developed by Tanita in 1992. This gives you a true indicator of your inner health and, when monitored over time, can show the impact of any fitness regime or weight loss program.So find out exactly what you are made of, set your goals and use Tanita to help you achieve your optimal fitness level and improve your health and wellbeing.

CHAPTER 2

REVIEW OF LITERATURE

Exercise and dieting will do only when the needs come in a person. In this case , people doesn't bothered about their diet and daily activity level. So it happens that, the percentage of overweight or obese cases are increasing day by day. Obesity or overweight is a medical condition that increases risk of other diseases and health problems, such as heart disease, diabetes, high blood pressure and certain cancers. Soit's very important that, to maintain body(compositions) in a healthy state.Here diet and exercise bears a important role to change overweight or obese statein to healthy stage. In the present context,analyzingbody compositional changesperiodically on the selected obeseor overweight clients who doesn't have any other health issues ,they are doing workout in a fitness center & following a proper diet (balanced diet modified with low energy, high fiber and high protein). The next step is utilizing the data provided by the research articles which will act as a framework for the formulation of the project.Thecollectedreviewsarepresented as follows;

2.1 Measurement of body composition (using TANITA Machine)

2.2 Accuracy & working principle ofBody analyzer.

2.3 Ideal body composition of a healthy person.

2.4 Role of exercise (30%) to achieve / maintain healthy body composition.

2.5 Role of diet (70%) to achieve / maintain healthy body composition.

2.6 Importance of balanced diet modified with low calorie,rich in fiber and proteinto

reduce excess body fat percentage.

2.7 Importance of functional foods to reduce excess body fat percentage.

2.0 REVIEW OF LITERATURE

2.1 Measurement of body composition

Clodagh M. Toomey *et al.,* **(2015)** This research article provides a summary of current technological advances in the measurement of human body composition and an overview of research- and field-based methods that are relevant to the health care professional in a clinical setting. Measurement of human body composition, plays an important role in qualifying health and nutritional status, the impact of disease, and change due to nutritional, therapeutic, or behavioral intervention. The accurate identification of those with either normal or nonnormal components of body composition requires an understanding of the available methods. Over the last century, the qualifying assumptions, accuracy, and precision of a variety of direct and indirect techniques of body composition measurement have been reported in the extant literature .It is evident that all of the available methods of body composition—both laboratory- andfield-based—are subject to inaccuracies due to assumptions made or methods applied during measurement. However, it is possible to conclude that there is no criterion method of body composition assessment for 2-C, 3-C, or4-C models. It is, however, possible to recommend methods of measurement that allow for an accurate and reliable measure of specific components of body composition that have clinical relevance, which, through advances in technology and validation research, are be-coming more widely available in clinical practice highlighted throughout this article, deciding which method of body composition assessment to use depends on a number of factors including (1) the availability of technology or trained personnel, (2) the population being assessed, (3) the tissue of importance, and (4) the indication for assessment. In cases where body composition assessment is used for disease diagnosis or as selection criteria, accuracy of measurement is paramount. However, in other instances where changes in particular body composition components while undergoing intervention are of interest, some field-based measures such as SFs, BIA, or ultrasonography may be clinically applicable. Regardless of the measurement tool, adherence to standardized pretest conditions during initial assessment and repeat assessments is imperative to reduce measurement error.

Kerri L Vasold *et al.,* **(2019)**compared portable body composition methods, such as bioelectrical impedance analysis (BIA), to air displacement plethysmography (ADP) to assess body composition in college students. Reliability was assessed using analysis of

variance to obtain an intraclass correlation statistic, and Validity was assessed using Pearson correlation coefficient.The RJL, Omron, and Tanita BIA machines appear to be both reliable and valid for predicting body compositions of male and female college students. Therefore, any of these three BIA devices is appropriate to use for body composition assessment in a healthy adult population.

Maria Franco-Villoria*et al.,***(2016)**Toexplore the usefulness of Bioelectrical Impedance Analysis (BIA) for general use by identifying best-evidenced formulae to calculate lean and fat mass, comparing these to historical gold standard data and comparing these results with machine-generated output. In addition, they explored how to best to adjust lean and fat estimates for height and how these overlapped with body mass index (BMI). As a result,Estimates of lean mass were similar to historical results using gold standard methods. Here,Lean and fat mass calculated from BIA using published formulae produces plausible values and demonstrate good concordance between high BMI and high fat, but these differ substantially from the machine-generated values. Bioelectrical impedance can supply a robust and useful field measure of body composition, so long as the machine-generated output is not used.

2.2Accuracy & working principle of Body analyzer.

Z Boneva-Asiova *et al.,*(2008) Aim of this study is to compare total weight, % body fat (% BF), fat mass (FM) and fat-free mass (FFM) measured by bioelectrical impedance analysis (BIA) and dual-energy X-ray absorptiometry (DXA). This cross-sectional study included 159 women (mean age: 49.1 +/- 10.0 years) and 124 men (mean age: 51.4 +/- 8.0 years) subdivided according to sex and body mass index (BMI): BMI < 30 kg/m(2) (66 women and 50 men); BMI 30-35 kg/m(2) (53 women and 44 men) and BMI > or = 35 kg/m(2) (40 women and 30 men). Bioelectrical impedance was performed in the fasting state on a Tanita TBF-215 leg-to-leg analyser (Tanita, Tokyo, Japan). Whole-body DXA scans were performed on a Hologic QDR 4500 A bone densitometer (Hologic, Bedford, MA, USA).Here,it's concluded that,Compared with DXA, the leg-to-leg Tanita TBF-215 analyser accurately assessed body composition in a heterogeneous group of both sexes. In the very obese women (BMI > 35 kg/m(2)), BIA measurements should be viewed with caution.

2.3 Ideal body composition of a healthy person.

Ronan Thibault et al., (2012) .established a theoretical discussion on evaluation of body composition. Screening of undernutrition is insufficient to allow for optimal nutrition care. This is in part due to the lack of sensitivity of BMI and weight loss for detecting FFM loss in patients with chronic diseases. Methods of body composition evaluation allow a quantitative measurement of FFM changes during the course of disease and could be used to detect FFM loss in the setting of an objective, systematic, and early undernutrition screening. FFM loss is closely related to impaired clinical outcomes, survival, and quality of life, as well as increased therapy toxicityin cancer patients. Thus, body composition evaluation should be integrated into clinical practice for the initial assessment, sequential follow-up of nutritional status, and the tailoring of nutritional and disease-specific therapies. Body composition evaluation could contribute to strengthening the role and credibility of nutrition in the global medical management, reducing the negative impact of malnutrition on the clinical outcome and quality of life, thereby increasing the overall medico-economic benefits

2.4 Role of exercise (30%) to achieve / maintain healthy body composition

Donnelly JE, Blair SN, Jakicic JM, et al., (2009) Analysed,Physical activity (PA) is recommended as a component of weight management for prevention of weight gain, for weight loss, and for prevention of weight regain after weight loss.

supports moderate-intensity PA between 150 and 250 min wk(-1) to be effective to prevent weight gain. Moderate-intensity PA between 150 and 250 min wk(-1) will provide only modest weight loss. Greater amounts of PA (>250 min wk(-1)) have been associated with clinically significant weight loss. Moderate-intensity PA between 150 and 250 min wk(-1) will improve weight loss in studies that use moderate diet restriction but not severe diet restriction. Cross-sectional and prospective studies indicate that after weight loss, weight maintenance is improved with PA >250 min wk(-1). evidence indicates that endurance PA or resistance training without weight loss improves health risk.

Andrea R Josse et al., (2011)aimed to determine how daily exercise (resistance and/or aerobic) and a hypoenergetic diet varying in protein and calcium content from dairy foods would affect the composition of weight lost in otherwise healthy, premenopausal, overweight, and obese women. Ninety participants were randomized to 3 groups: high protein, high dairy (HPHD), adequate protein, medium dairy (APMD), and adequate protein, low dairy (APLD) differing in the quantity of total dietary protein and dairy food-source protein consumed: 30 and 15%, 15 and 7.5%, or 15 and <2% of energy, respectively. Body composition was measured by DXA at 0, 8, and 16 wk to assess visceral adipose tissue (VAT) volume at 0 and 16 wk. All groups lost body weight and fat , however, fat loss during wk 8-16 was greater in the HPHD group than in the APMD and APLD groups . The HPHD group gained lean tissue with a greater increase during 8-16 wk than the APMD group, which maintained lean mass and the APLD group, which lost lean mass .The HPHD group also lost more VAT as assessed by MRI and trunk fat as assessed by DXA .than the APLD group. The reduction in VAT in all groups was correlated with intakes of calciumand protein . Therefore, diet- and exercise-induced weight loss with higher protein and increased dairy product intakes promotes more favorable body composition changes in women characterized by greater total and visceral fat loss and lean mass gain

Chad Kerksick et al.,(2009). Determine the safety and efficacy of altering the ratio of carbohydrate and protein in low-energy diets in conjunction with a popular exercise program in obese women. One-hundred sixty one sedentary, obese, pre-menopausal womenparticipated in this study. Study analysed that, **Participants** were assigned to either a no exercise + no diet control (CON), a no diet + exercise group (ND), or one of four diet + exercise groups (presented as kcals; % carbohydrate: protein: fat): 1) a high energy, high carbohydrate, low protein diet (HED) [2,600; 55:15:30%], 2) a very low carbohydrate, high protein diet (VLCHP) [1,200 kcals; 63:7:30%], 3) a low carbohydrate, moderate protein diet (LCMP) [1,200 kcals; 50:20:30%] and 4) a high carbohydrate, low protein diet (HCLP) [1,200 kcals; 55:15:30%]. Participants in exercise groups (all but CON) performed a pneumatic resistance-based, circuit training program under supervision three times per week.Exercise alone (ND) appears to have minimal impact on measured outcomes with positive outcomes apparent when exercise is combined with a hypoenergetic diet. Greater improvements in waist circumference and body composition occurred when carbohydrate is replaced in the diet with protein. Weight loss in all diet

groups (VLCHP, LCMP and HCLP) was primarily fat and stimulated improvements in markers of cardiovascular disease risk, body composition, energy expenditure and psychosocial parameters.

2.5 Role of diet (70%) to achieve / maintain healthy body composition.

Janet Walberg Rankin*et al., (2013)*established a theoretical discussion on the process of improve body composition in obese individual that,health care teams need specific

science-based recommendations to advise clients on lifestyle approaches to alter body composition. Combining exercise with modest energy restriction is recommended to cause up to 20% more weight and fat loss, improved function, and reduced lean mass loss than modification of diet alone. The optimal diet for developing a leaner body composition is one that is modestly reduced in energy and contains lower fat and higher protein than average. Aerobic exercise alone may cause minimal change in body weight (1%-3%) and fat if greater than 250 min/wk. Higher intensity or duration of exercise can cause more substantial fat loss but may have poor long-term compliance. Resistance exercise boosts lean body mass and improves some health indicators but generally does not cause fat loss. In summary, consumption of a low-fat (20%-25% of energy), moderately high-protein (>1.2 g/kg and up to 20%-25% of energy) diet with modestly reduced energy (500-1000 kcal/d) combined with aerobic (3-5 d/wk, at least 250 min/wk) and resistance.

Helen M Seagle et al.,(2009) Using the American Dietetic Association's Evidence Analysis Process and Evidence Analysis Library, this position paper presents the current data and recommendations for weight management. The evidence supporting the value of portion control, eating frequency, meal replacements, and very-low-energy diets are discussed as well as physical activity, behavior therapy, pharmacotherapy, and surgery. Public policy changes to create environments that can assist all populations to achieve and sustain healthful lifestyle behaviors are also reviewed.

Dale A Schoeller et al., (2005) Speculate that it is the protein, and not carbohydrate, content that is important in promoting short-term weight loss and that this effect is likely due to increased satiety caused by increased dietary protein. It has been suggested that the increased satiety might help persons to be more compliant with a hypocaloric diet and achieve greater weight loss. The current evidence, combined with the need to meet all

nutrient requirements, suggests that hypocaloric weight-loss diets should be moderate in carbohydrate (35% to 50% of energy), moderate in fat (25% to 35% of energy), and protein should contribute 25% to 30% of energy intake. More studies of the efficacy of weight-loss and weight-maintenance diets that address protein content are needed. In addition, controlled studies of total energy expenditure or physical activity measured under free-living conditions that directly compare high-protein diets with those containing low and moderate carbohydrate content should also be performed.

Annemarie Koster et al ., (2010) This study examined differences in body fat distribution and adipocytokines in obese older persons with and without metabolic syndrome. Additionally, we examined whether adipocytokines mediate the association between body fat distribution and metabolic syndrome. Data were from 729 obese men and women (BMI $\geq$ 30 kg/m(2)), aged 70-79 participating in the Health, Aging and Body Composition (Health ABC) study. In summary, metabolically healthy obese older persons had a more favorable fat distribution, characterized by lower visceral fat and greater thigh subcutaneous fat and a more favorable inflammatory profile compared to their metabolically unhealthy obese counterparts.

Donald K Layman et al., (2009). Diets with increased protein and reduced carbohydrates (PRO) are effective for weight loss, but the long-term effect on maintenance is unknown . This study compared changes in body weight and composition and blood lipids after short-term weight loss (4 mo) followed by weight maintenance (8 mo) using moderate PRO or conventional high-carbohydrate (CHO) diets.The CHO diet reduced serum cholesterol and LDL cholesterol compared with PRO (P < 0.01) at 4 mo, but the effect did not remain at 12 mo. PRO had sustained favorable effects on serum triacylglycerol (TAG), HDL cholesterol (HDL-C), and TAG:HDL-C compared with CHO at 4 and 12 mo (P < 0.01). The PRO diet was more effective for FM loss and body composition improvement during initial weight loss and long-term maintenance and produced sustained reductions in TAG and increases in HDL-C compared with the CHO diet.

2.6 Importance of balanced diet modified with low calorie, rich in fiber and protein to Reduce excess body fat percentage

N Finer et al., (2001) examined a few randomized trials have been conducted and various adjunctive therapies confound interpretation. Systematic reviews of low-calorie diets have been unable to come to any firm conclusions about the value of different ways of

achieving energy restriction, but one meta-analysis of low-fat diets produced a mean weight loss of 10 kg of weight loss that was greater in those with a higher initial body weight. Greater weight loss was achieved by subjects prescribed a 600-kcal deficit diet, compared with a conventional low-calorie (1200 kcal/d) diet. This study has been influential for clinical dietetic practice, particularly with UK dietitians, but also in the design of dietetic support in clinical trials of pharmacotherapy. Low-calorie diets can be effective treatment, but the optimum way of delivering such diets remains unclear.

.James W Krieger et al.,(2006) .This study analysed the effects of variations in protein and carbohydrate intakes on body mass and composition during energy restriction.After control for energy intake, diets consisting of < or =35-41.4% energy from carbohydrate were associated with a 1.74 kg greater loss of body mass, a 0.69 kg greater loss of fat-free mass, a 1.29% greater loss in percentage body fat, and a 2.05 kg greater loss of fat mass than were diets with a higher percentage of energy from carbohydrate. In studies that were conducted for >12 wk, these differences increased to 6.56 kg, 1.74 kg, 3.55%, and 5.57 kg, respectively. Protein intakes of >1.05 g/kg were associated with 0.60 kg additional fat-free mass retention compared with diets with protein intakes < or =1.05 g/kg. In studies conducted for >12 wk, this difference increased to 1.21 kg. No significant effects of protein intake on loss of either body mass or fat mass were observed.AsConclusion Low-carbohydrate, high-protein diets favorably affect body mass and composition independent of energy intake, which in part supports the proposed metabolic advantage of these diets.

Alain J Nordmann et al.,(2006). Comparing the effects of low-carbohydrate diets without restriction of energy intake vs low-fat diets in individuals with a body mass index (calculated as weight in kilograms divided by the square of height in meters) of at least 25. Included trials had to report changes in body weight in intention-to-treat analysis and to have a follow-up of at least 6 months. Two reviewers independently assessed trial eligibility and quality of randomized controlled trials.Low-carbohydrate, non-energy-restricted diets appear to be at least as effective as low-fat, energy-restricted diets in inducing weight loss for up to 1 year. However, potential favorable changes in triglyceride and high-density lipoprotein cholesterol values should be weighed against potential unfavorable changes in low-density lipoprotein cholesterol values when low-carbohydrate diets to induce weight loss are considered.

2.7 Importance of functional foods to reduce excess body fat percentage.

Xue Li et al..,(2016) his study aimed to evaluate the short-and long-term effects of oat intake and develop a reasonable dietary plan for overweight T2DM patients. A randomized control trial, registered under ClinicalTrials,it was carried out among adult T2DM patients. A subgroup of 298 overweight subjects was selected and received a 30 day centralized intervention and 1-year free-living follow-up. Participants were randomly allocated to at least one of the subsequent four groups. The usual care group (n= 60) received no intervention; the healthy diet group (n= 79) received a low-fat and high-fiber diet ("healthy diet"); the 50 g-oats group (n= 80) and 100 g-oats group (n= 79) received the "healthy diet" with an equivalent amount of cereals replaced by 50 g and 100 goats respectively. Anthropometric, blood glycemic and lipid variables were measured. For the 30-day intervention, significant differences within the changes of FPG (fasting plasma glucose), PPG (postprandial plasma glucose), HbA1c (glycosylated hemoglobin), HOMA-IR (homeostasis model assessment of insulin resistance), TC (total cholesterol), TG (total triglycerides), and LDL-c (low-density lipoprotein cholesterol) were observed among the four groups. In conclusion, short-and long-term oat intake had significant effects on controlling hyperglycemia, lowering blood lipids, and reducing weight. His study provided some supportive evidence for recommending oat as a good whole grain selection for overweight and even diabetic too.

Imran Khan, FarukhTabassum.., et Al (2008) Conducted a study on , glycemic indicies and glycemic loads of local pulses namely chickpea, chana dal, kidney bean, mash bean, mung bean and peas for diabetic diet. Forty two male students of Agricultural University were recruited and were divided into six groups, with seven students in each group. Glucose was fed as reference and pulses as test foods. The pulses were cooked (only boiled) in tape water before feeding to the individuals. Fifty grams glucose, dissolved in 300 mL of water, was given to each individual of all the groups on day first and amount of the boiled pulses containing 50 g carbohydrate were given to each individual of the assigned group on the next day. Blood samples were collected from each individual of the groups before (fasting) the ingestion of glucose and test foods and 30, 60 and 120 minutes after ingestion of glucose and test foods. Glycemic index was determined from the area under curves of glucose concentration for reference and test foods. Glycemic load was determined by taking the percentage of the food, s carbohydrate content in a typical serving and multipling by its glycemic index. The mean glycemic index for chick pea,

chana dal, kidney bean, mash bean, mung bean and peas were 36, 13, 32, 43, 42 and 25 respectively. The mean glycemic loads for these pulses were 12, 4, 8, 10, 7 and 2 respectively. The results of the study indicated that local pulses have low glycemic indices and glycemic loads, hence could be a helpful ingredient for weight reduction even can use in the diet of diabetic patient .

CHAPTER 3

METHODOLOGY

After analysing about the findings and conclusions so far with the help of the literature review, the method for formulating this project is set up. The section involves every minute detail about the energy intake, energy expenditure,the diet they used, the cooking and processing methods employed in their diet , the body composition analysis method used. On the whole this section, gives information about all the analysis done on the project during the time of its study(3months).

The major areas of concern are daily weight measurement,daily diet counseling and corrections ,monthlyBodycomposition Analysis.Apart from this, Analysis of psycho-physical changes and the confidence about their body imagewill do during daily consultation time.Diet calculation is also an integral part. All these factors will contribute to the transformation of unhealthy bodyweight to a healthy and comfortable bodyweight.

The methods employed for this analysis are the standardised procedures such as daily weight check up on the same time before work out using astandard TANITA machine, dailydiet follow up,and correting the diet if client have done any mistakes in that, monthly body composition analysis and setting nextgoals along with Modifying their diet accordingly during the monthly detailed consultation . During this half an hour to one hour (once in amonth) I will explain to the client that how is their progress in their body composition ,and Analyse how they are feeling about the weight reduction ,any changes in skin, hair growth like all minute changes in their body will consider here. Through this consultation I can understand how I have to modify their diet for the next target.

The materials, food ingredients and selection ofmethod of preparation of this therapeutic diet along with kind of daily work out gives detailed information regarding the concept behind this method of correcting body composition.

3.1METHODOLOGICAL APPROACH:-

3.11:- Step :1

Taking Body Composition Analyser (BCA)machine report of a new client:-

The Tanita body-fat analyser is a novel device to estimate body fat, based on the principles of bioelectrical impedance.Bioelectrical Impedance Analysis(BIA) assesses body fat by passing a very small current through thebody and assessing differences in impedance caused by the fact that fat and lean tissues have different electrical properties .studiesdemonstrates that the practical simplicity of the novel Tanita method is not associated with a clinically significant decrement in performance relative to a traditional impedance device.

Importance of Tanita machine report(body composition report) :-

Tanita machine report is quantitative analysis of body composition .The total body weight; is made up of fat mass ,muscle mass and bone mass. While seeing one client's report nutritionist can understand which kind of food the person have to intake more or which kind of food have to restrict or avoid according to the BCA , personal health status and food sensitivity. Since foods are divided mainly in to 3groups according to their function like ;energy giving, body building and protective / regulatory foods. Those food groups can change each mass by making changes in the consumption of each food groups portion size , to prepare a perfect personal diet chart have to know values of all those mass by which their total body made up of. All mass should be in healthy range , that will give healthy body weight.Sotanita machine plays important role to know how a person's total body weight made up of   So all those tanita machine reading will help a person to know their body composition. According to that ,a person have to maintain their weight with help of perfect nutrition though daily diet and dedicated daily work out with the support of inner mind through high confidence.

3.12 Step :2

30-60 min of personal diet consultation

In first session of this consultation explains about their current body composition , what is Healthy body composition ranges according to the Tanita machine report , risks of unhealthy body composition leading to lifestyle diseases and other issues. How a healthy Lifestyle can change these body composition in to a healthy range (importance of "modified balanced diet", daily physical activity, sleep – meal timings..)

In the second session of consultation, takes all the personal health, diet, physical activity, and sleepdetails about the client , to know how that person gained more fat mass in their body and also Share the findings behind their unhealthy fat deposition . Client details which includes current Health issues and medication as well as their history details, food allergies , 24hours general diet recalls, like and dislike foods, food habits (type of meal, portion size and proportion of food groups in their daily meals , meal timings, food cravings), Daily physical activity range (type such as sedentary activity, moderate activity and heavy activity ,and duration of work) ,sleep timings , intensity of sleep …these details are more than enough to find out the reason behind their fat gain.

*General diet guidelines for obese clients:-

1. Avoid simple carbohydrate sources (table sugars ,white rice,bread, maida products, bakery items, sugary items like ice-cream..,highly processed foods, carbonated sweet beverages, artificial sweetened&colouredpowder drink mix and junk foods)
2. Avoid oily items (oily junk foods(main source of trans fat) , fried items ,animal food products..)
3. Completely avoid the source of trans fat and Restrict the use of visible saturated fat.
4. Use unsaturated fats (mono unsaturated fats[olive,peanut,canolaoils;avocados;nuts -almond, hazelnut,pecans;seeds-pumpkin and sesame Seeds] And polyunsaturated fats [Sunflower , corn ,soybean, flax seed oils; walnuts,flaxseed,fish ,canola oil]
5. Start your day with luke warm water instead of tea.
6. Complete dinner before sunset.
7. Include these in daily diet;

- Use only whole grain cereals (rolled oats, broken wheat ,millets, brown rice, barely..)
- Use only whole grain pulses instead of dhals.
- Sprouting, fermenting, steaming cooking methods.
- Include 5servings of vegetables .Have plenty of fresh vegetablesas salad.
- Include 1-2servings of fruits (apple,pear,pomogranate, muskmelon,guava,jambu,orange,papaya)
- Include nuts and seeds limited quantity
- Drink water when you feel thirsty,try to give water according to body needs
- Use 2tbsp curd in alternatively (natural probiotic)
- Use tender coconut water with chia seedsalternatively (natural electrolyte)

8. Avoid starchy vegetables like potatoes and high carbohydrate fruits like banana.
9. Avoid dryfruits since it's contain high concentrate calories

10.plant protein sources are always preferable for obese people than animal protein sources. since it's a source of saturated fat. Can use milk in limited quantity(1serving) but skimmed and diluted form , eggwhite are preferable if client Using eggs, lean meat is always better than red meat.

11.CanIncrease number ofmodified balanced meals but the ingredients in the plate should be low calorie(complex carbohydrate in small amount) ,rich in fiber(slow bowel movement)and high plant protein(take more time for digestion) so that client will feel satiety , since there is a less chance of getting unhealthy food cravings. Portion size of each food groups in the plate Should be small in Quantity and high in quality.

12.if clients feeling to have normal food apart from weight loss diet , take that food in small quantity and keep 50%of raw salads in plate,1/4th of plate as plant protein source or lean animal protein source and take it as a complete meal .

In the third session of this consultation is doubts clearing session, where clients have the permission to ask any doubts regarding diet, health, fitness, Nutrition…

Now clients are already educated about the current body composition, what changes they have to make in that composition to maintain a healthy body ;how diet , physical activity

and all over lifestyle help to achieve that. At the end of the session will make slight change in their normal diet to a modified balanced version to achieve their goals according to their convenience.

This is the general frame of personal diet consultation.But some clients need a calculated diet chart of a modified balanced diet and daily dietfollow-up of their weight and diet. For this project , I included 20 clients report to whom I followed daily .

3.13 Step :3

Preparing calculated dietchart for each clients :-

- **Condition**:-The selected 20 clientswere coming under sedentary male and moderate femalegroup and obese or overweight category.
- **Principles of diet management:-**low calorie (500- 1000 kcal less from EAR), normal protein(20% of total Calorie),restricted carbohydrates-complex carb form(45-50% of total calorie intake),high fiber(20-35g), restricted fats(10%of total calorie), liberal fluid, vitamin -mineral rich (except sodium) diet is prescribed.

1.Nutrient calculation:-

Modified recommend dietary allowances of sedentary male& moderate female:-

1. **Energy for sedentary male :-.**

EAR –500 to 1000 kcal

a)2110 -500kcal=1610kcal

b) 2110 – 1000kcal=1110kcal

Hence, accepted calorie range will be **1610kcal to 1110kcal**

2. **Energy for moderate female:-**

   EAR -500 to 1000kcal
   a)2130-500kcal =1630kcal
   b)2130-1000kcal= 1130kcal
   Hence accepted calorie range will be **1630kcal to 1130kcal**

3. **Protein for sedentary male and moderate female :-**

20%of total calorie intake

$1479 \times 20/100 = 295.8$ kcal

$=295.8/4$

$$= \textbf{74g}$$

4. **Fat for sedentary male and moderate female :-**
   10% of total calorie intake
   $1479 \times 10/100 = 147.9$ kcal
   $=147.9/9$
   $$= \textbf{16.4g}$$

5. **Carbohydratefor sedentary male and moderate female:-**

   47%of total calorie intake

   $1479 \times 47/100 = 695.13$

   $=695.13/4$

   $= \textbf{173.78g}$

2.Dietary allowances:-

Nutrients	*EAR(sedentary male)	*MEAR(sedentary male)	EAR (Moderate female)	MEAR (moderate female)
Energy (kcal)	2110	1479	2130	1479
Protein (g)	42.9	77	36.3	77
fat (g)	25	15	25	15
Carbohydrate (g)	100	173	100	173
Calcium (mg)	800	800	800	800
Magnesium (mg)	320	320	270	270
Iron (mg)	11	11	15	15
Zinc(mg)	14	14	11	11
Iodine (μg)	95	95	95	95
Thiamine (mg)	1.2	1.2	1.4	1.4
Riboflavin (mg)	1.6	1.6	2	2
Niacin (mg)	12	12	12	12
Vit B6(mg)	1.6	1.6	1.6	1.6
Folate(μg)	250	250	180	180
Vit B12(μg)	2	2	2	2
Vit C(mg)	65	65	55	55
Vit A(μg)	460	460	390	390
Vit D (IU)	400	400	400	400

*EAR- Estimated Average Requirements

*MEAR – Modified Estimated Average Requirements

3.recommend exchange list:-

Food groups	No.of servings	Amount (g/ml)	Energy (kcal)	Protein (g)	Carbohydrate (g)
Whole grain Cereals and millets	4	120	400	12	80
Pulses	3	90	300	18	45
Egg whites	4	120	64	16	-
Lean Chicken /fish	2	100	200	18	-
Milk and milk products	1	100	70	3	5
Roots and tubers	1	100	80	1.3	18
Green leafy vegetables	1	100	46	3.6	-
Other vegetables	3	300	84	5.1	-
Fruits	2	200	80	-	20
Honey /jaggery	1	5	20	-	5
Fats and oils (visible)	3	15	135	-	-
Total			1479kcal	77g	173g

4.Menu planning for both condition:-

Meal	Menu	Ingredients	Amount (g/ml)
Early morning:-	Home made greentea	Water	250ml
		Basil leaves	6no.
		Mint leaves	6no.
		Chia seed	1tsp
		Honey	1tsp
		Ginger juice	1tsp
		Lemon juice	1tsp
	Soaked almonds		
		Almonds	5g
Breakfast	Oats /broken wheat pulavo	Rolled oats/ broken wheat	30g
		Sweet corn	
		Greengram Sprouts	15g
		Beans	30g
		Capsicum	50g
		Pomogranate	50g
		Flaxseed oil	50g
			2.5ml
	Or		
		Rolled oats	
	Sprouts-oats dosa	Jowar	30g
		Green gram Sprouts	15g
			30g
		Capsicum	
	Veg masala	Beans	50g
		Ladies finger	50g

		Flaxseed oil	50g 5ml
Mid-morning	Fruit	Apple/pear/guava/papaya	50g
	Chiaseed-buttermilk	Curd	30g
		Chiaseed	5g
		Coriander leaves	10g
Lunch	Ragi/any other Millets phulka	Ragi	30g
		Palak	40g
	Veg – horsegramcurry	Beans/ladies finger/ridge gourd	75g
		Horsegram	30g
		Cucumber	
	Carrot -Cucumber slices	Carrot	75g
			50g
		Fish	
	Fish		50g
Evening snack	Home made green tea	Water	250ml
		Basil leaves	6no.
		Mint leaves	6no.
		Chia seed	1tsp
		Honey	1tsp
		Ginger juice	1tsp
		Lemon juice	1tsp
	Fruit-sprouts-seeds salad	Pomegranate	50g
		Green gram Sprouts	15g
		Sesame seeds(roasted)	5g

Dinner	Soup		
		Oats	30g
		Green pea	15g
		Corn	15g
		Beans	50g
		Carrot	50g
	Fish	Palak	40g
		Olive oil	2.5ml
		Fish	50g
Bed time	Diluted turmeric skimmed milk	Milk	70ml

Post workout meal	Egg whites	Egg whites	120g
	Pineapple cubes	Pineapple or Apple	50g

Client 's meal pics:-

Breakfast:-
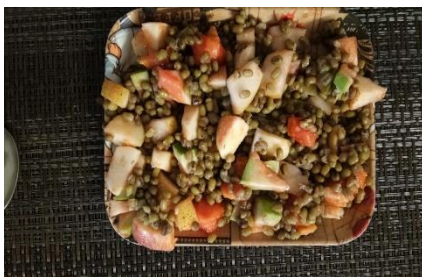
Lunch:-

Evening snack:-
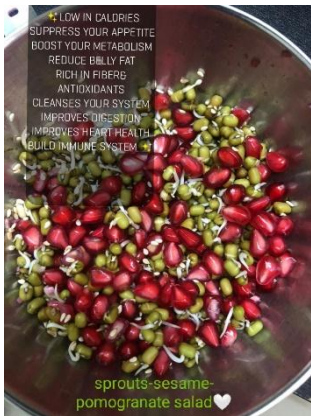
Dinner:-

Step :4

Periodical Analysis of clients progression:-

1.Daily weight measurement

2.monthly body composition measurement using Tanita machine

3.monthly consultation -comparing the body compositional changes and changing diet from modified balanced diet (to reduce body fat) to balanced diet (to maintain the weight)according to the results.

Data collection:

1)Monthly body composition measurement using TANITA machine

2)taking all cleintspsychological analysis during weight reduction via monthly counseling.

CHAPTER 4

RESULTS AND DISCUSSION

The methodology used for analysis of body composition changesthroughfollowing recommended daily diet and work out , is studied and the outcome of the project is depicted in the section of results. The result is completely dependent on cleint's dedication, consistency in their diet (energy intake) andwork out (energy expenditure) are important to achieve good results.

 Discussion gave a clear picture on the authenticity of the study along with the accuracy of the methodological approach undertaken. The results depicted in the comparison form of body composition before taking the therapeutic diet and after completing 3 months of daily dieting along with one hour floor exercise , using three series of Tanita body composition analyser's report analysis, On the whole this section, illustrates the outcome of the effect of therapeutic diet (low calorie, complex carbohydrate ,moderate to high protein ,low fat,high fiber ,rich in minerals and vitamins along with enough fluids) and physical activity in weight reduction (body composition changes)

4.1 RESULTS

Tanita body composition analyser report comparisocomparison

First report:-

Name	Age	Gender	Height (cm)	Weight (kg)	BMI (kg/m^2).	Muscle mass (kg)	Fat mass (kg)	Bone mass(kg	Metabolic age	Visceral fat
1	41	Male	173	82 .9	27.7	56.9	22.9	3.1	51	14
2	22	Male	168	79	28	54.4	21.6	3	41	11
3	32	Female	168	99.4	35.2	49.6	46.3	3.5	57	11
4	19	Female	164	90.3	33.6	46.6	40.5	3.2	43	9

5	48	Female	181	101.6	31	53.7	44.1	3.8	64	11
6	32	Male	169	117.3	41.1	68.6	45	3.7	57	20
7	22	Male	183	112.6	33.6	72.4	36.3	3.9	47	15
8	30	Male	180	133.8	41.3	77.8	51.8	4.2	55	20
9	37	Female	163	70.1	26.4	41.3	26.1	2.7	52	7
10	40	Female	160	89.7	35	44.4	42.3	3	65	12
11	18	Female	168	101.7	36	50.3	47.9	3.5	54	10
12	48	Male	175	100.5	32.8	65.6	31.3	3.6	60	18
13	49	Female	161	78.1	30.1	42.1	33.2	2.8	67	10
14	39	Male	180	89.2	27.5	60.6	25.3	3.3	51	14
15	24	Male	167	89.9	32.2	59.5	27.2	3.2	49	14
16	33	Male	175	90.4	29.5	63.3	23.7	3.4	41	
17	28	Female	156	72	30.0	39.8	29.7	2.5	53	8
18	34	Male	178	105.0	33.1	67.7	33.6	3.7	58	16
19	23	Female	163	81.5	30.7	44.3	34.2	3.0	48	8
20	24	Male	168	87	30.8	59.0	24.8	3.2	45	13

2nd report after 30days

2nd report after 30days

Name	Weight(kg)	BMI (kg/m2)	Muscle mass (kg)	Fat mass (kg)	Bone mass(kg)	Metabolic age	Visceral fat
1	78.8	26.3	56.2	19.6	3.05	48	13
2	75.1	26.7	53.4	18.8	2.9	37	10
3	96.2	34.1	49.2	43.6	3.4	56	11
4	84.4	31.4	45.4	42.5	3.1	41	8
5	97.1	29.6	52.8	40.6	3.7	62	11
6	113.1	39.7	67.7	41.8	3.6	56	19
7	107.8	32.2	71.7	32.3	3.8	46	14
8	128.8	39.7	76.8	47.9	4.1	53	19
9	67	25.2	40.7	23.7	2.6	49	7
10	85.6	33.4	43.9	39.0	2.9	63	11
11	97.3	34.7	49.7	44.2	3.4	53	10
12	96.6	31.5	64.9	28.2	3.5	59	17
13	74.9	28.9	41.5	30.7	2.7	65	10
14	85.3	26.3	59.7	22.4	3.3	49	13
15	85.7	31.7	58.4	24.2	3.1	47	14
16	85.3	27.8	62.0	20	3.3	39	13
17	68.9	28.7	38.4	28	2.5	51	8
18	100.8	32.5	66.5	30.7	3.6	56	15
19	76.1	30.1	43.1	30.1	2.9	47	7
20	82.2	29.3	58.1	21.0	3.1	44	12

3rd report after 60days

Name	Weight(kg)	BMI (kg/m2)	Muscle mass (kg)	Fat mass (kg)	Bone mass(kg)	Metabolic age	Visceral fat
1	74.8	25.0	55.6	16.35	3.0	45	12
2	72.1	25.5	53.2	16	2.9	33	9
3	92.2	32.6	48.7	40.1	3.4	53	10
4	79.6	29.6	44.5	40.3	3.0	40	8
5	93.3	28.5	52.1	*37.6*	3.6	60	10
6	111.0	38.9	67.1	40.3	3.6	55	18
7	102.8	30.7	70.7	28.4	3.7	43	13
8	124.2	38.3	75.7	44.5	4	51	19
9	64.2	24.5	39.9	21.8	2.5	47	6
10	81.6	31.87	43.2	35.7	2.9	60	10
11	92.6	32.9	48.8	40.5	3.3	50	9
12	92.8	30.3	64.2	25.2	3.4	57	15
13	70.4	27.1	40.3	27.5	2.6	61	9
14	82.2	25.0	58.5	20.5	3.2	47	12
15	81.9	30.3	57.3	21.5	3.05	44	13
16	81.2	26.5	60.7	17.3	3.2	37	12
17	65.4	27.2	37.6	25.4	2.4	48	8
18	96.6	31.1	65.6	27.4	3.55	53	14
19	72.5	27.3	42.1	27.6	2.8	46	7
20	78.1	27.8	57.5	17.5	3.05	42	11

4th report after 90 days

Name	Weight(kg)	BMI (kg/m2)	Muscle mass (kg)	Fat mass (kg)	Bone mass(kg)	Metabolic age	Visceral fat
1	70.9	23.7	55.2	12.8	2.9	41	10
2	69.0	24.4	53.0	15.9	2.8	28	8
3	88.0	31.2	48.2	36.6	3.3	49	10
4	75.6	28.1	46.6	29.0	2.9	39	7
5	89.3	27.3	51.6	34.2	3.5	58	9
6	106.0	37.1	66.1	36.4	3.5	51	16
7	98.3	29.4	70.6	24.1	3.6	39	12
8	120.2	37.0	74.9	41.2	3.9	38	18
9	61.1	23.0	39.4	19.2	2.5	45	6
10	77.4	30.1	42.8	31.8	2.8	58	9
11	88	31.4	48.1	37.2	3.3	47	9
12	89	29.0	63.2	22.5	3.3	55	13
13	66.6	25.7	39.3	24.7	2.6	58	8
14	79.9	24.6	58.0	18.7	3.2	45	11
15	77.4	29.0	55.1	19.2	3.1	40	12
16	78.0	25.4	58.9	16.0	3.15	36	11
17	60.9	25.3	37.4	21.1	2.4	44	7
18	92.2	29.7	64.4	24.3	3.5	49	13
19	70.6	26.6	41.3	26.6	2.7	43	6
20	75.0	26.7	56.9	15.1	3	39	10

4.2 DISCUSSION:-

This data reveals that each month there is a dicrease in the total weight of this selected 20clients. The average weight reduction is 4 kg per month by following the above calculated diet and one hour daily floor exercise such as Circuit ,Jumping jacks, Full burpee , High knees, Punches, Mountain climbers , Standing crunches , Free squats , Glute bridges, Football sprints ,Plank… Most of all clients reduce more mass from fat mass,then from muscle and bone mass as small ratio. The average reduction per month is 4kg, where 3.2kg as fat mass,700g as muscle mass and 100g as bone mass .it's a healthy way of reduction in body mass.

SUMMARY AND CONCLUSION

SUMMARY:-

This results shows the importance of diet and physical activity to change unhealthy body composition of a person to healthy state. These are my personal clients in zuese fitness club that I am doing the diet and physical activity following ups daily. The daily weight measurement and the monthly body composition analyser reports will give them more confidence, that they can lose their weight in a perfect way. Actually this is a 6th month transformation program in our fitness club , there we were following around 5O members , but all were not pretty consistent, since here I used the data of my consisted clients. After taking each monthly body composition report , one half an hour Consultation would be there, it's like a discussion session with nutritionist and client. Where we are discuss about the changes in their body composition, diet modification if clients required, physical appearance, mental feelings about their body weight , and next weight goal setup…after the session cleints will clear off all there doubts.

CONCLUSION:-

The syllabus of 2nd year M.Sc Food science and Nutrition prescribed by the Mangalore University included taking up of project program . I choose "IMPORTANCE OF DIET AND EXERCISE TO MAINTAIN BODY COMPOSITION -A DATA COLLECTION STUDY" as my project topic ,since I am working (part time) as fitness nutrition in Zuese Fitness Club , Mangalore.

It's a 3month data collection study of my own gym clients.The results of this project works give the importance of Diet and exercise/physical activity in a person to maintain their Health.It was a wonderful experience ,here I applied all my nutrition knowledge to prepare the suitable diet ,and guid clients daily.Its not only helps to improve my skills and confidence but also the consistent diet and workout follow ups helps to the clients to come back in healthy body composition.The transformation also gives a lot of confidence to them along with Fitness knowledge.The knowledge which I obtained from this project work will definitely help us in our future educational endeavors.

REFERENCE:-

1). Church TS, Thomas DM, Tudor-Locke C, et al. Trends over 5 decades in U.S. occupation-related physical activity and their associations with obesity. PLoS One. 2011;6(5):e19657. [PMC free article] [PubMed] [Google Scholar]

2)Vasold KL, Parks AC, Phelan DML, Pontifex MB, Pivarnik JM. Reliability and Validity of Commercially Available Low-Cost Bioelectrical Impedance Analysis. Int J Sport NutrExercMetab. 2019 Jul 1;29(4):406–410. doi: 10.1123/ijsnem.2018-0283. PMID: 30507268.

3)Franco-Villoria M, Wright CM, McColl JH, Sherriff A, Pearce MS; Gateshead Millennium Study core team. Assessment of adult body composition using bioelectrical impedance: comparison of researcher calculated to machine outputted values. BMJ Open. 2016 Jan 7;6(1):e008922. doi: 10.1136/bmjopen-2015-008922. PMID: 26743700; PMCID: PMC4716172.

4)Boneva-Asiova Z, Boyanov MA. Body composition analysis by leg-to-leg bioelectrical impedance and dual-energy X-ray absorptiometry in non-obese and obese individuals. Diabetes ObesMetab. 2008 Nov;10(11):1012-8. doi: 10.1111/j.1463-1326.2008.00851.x. Epub 2008 Apr 22. PMID: 18435776.

5)Donnelly JE, Blair SN, Jakicic JM, Manore MM, Rankin JW, Smith BK; American College of Sports Medicine. American College of Sports Medicine Position Stand. Appropriate physical activity intervention strategies for weight loss and prevention of weight regain for adults. Med Sci Sports Exerc. 2009 Feb;41(2):459-71. doi: 10.1249/MSS.0b013e3181949333. Erratum in: Med Sci Sports Exerc. 2009 Jul;41(7):1532. PMID: 19127177.

6)Seagle HM, Strain GW, Makris A, Reeves RS; American Dietetic Association. Position of the American Dietetic Association: weight management. J Am Diet Assoc. 2009 Feb;109(2):330-46. doi: 10.1016/j.jada.2008.11.041. PMID: 19244669.

7)Finer N. Low-calorie diets and sustained weight loss. Obes Res. 2001 Nov;9 Suppl 4:290S-294S. doi: 10.1038/oby.2001.133. PMID: 11707556.

8) Schoeller DA, Buchholz AC. Energetics of obesity and weight control: does diet composition matter? J Am Diet Assoc. 2005 May;105(5 Suppl 1):S24-8. doi: 10.1016/j.jada.2005.02.025. PMID: 15867892.

9) Josse AR, Atkinson SA, Tarnopolsky MA, Phillips SM. Increased consumption of dairy foods and protein during diet- and exercise-induced weight loss promotes fat mass loss and lean mass gain in overweight and obese premenopausal women. J Nutr. 2011 Sep;141(9):1626-34. doi: 10.3945/jn.111.141028. Epub 2011 Jul 20. PMID: 21775530; PMCID: PMC3159052.

10)Layman DK, Evans EM, Erickson D, Seyler J, Weber J, Bagshaw D, Griel A, Psota T, Kris-Etherton P. A moderate-protein diet produces sustained weight loss and long-term changes in body composition and blood lipids in obese adults. J Nutr. 2009 Mar;139(3):514-21. doi: 10.3945/jn.108.099440. Epub 2009 Jan 21. PMID: 19158228.

11)Krieger JW, Sitren HS, Daniels MJ, Langkamp-Henken B. Effects of variation in protein and carbohydrate intake on body mass and composition during energy restriction: a meta-regression 1. Am J ClinNutr. 2006 Feb;83(2):260-74. doi: 10.1093/ajcn/83.2.260. PMID: 16469983.

Kerksick C, Thomas A, Campbell B, Taylor L, Wilborn C, Marcello B, Roberts M, Pfau E, Grimstvedt M, Opusunju J, Magrans-Courtney T, Rasmussen C, Wilson R, Kreider RB. Effects of a popular exercise and weight loss program on weight loss, body composition, energy expenditure and health in obese women. NutrMetab (Lond). 2009 May 14;6:23. Doi: 10.1186/1743-7075-6-23. PMID: 19442301; PMCID: PMC2693519.

12)Loveman E, Frampton GK, Shepherd J, et al. The clinical effectiveness and cost-effectiveness of long-term weight management schemes for adults: a systematic review. Health technology assessment (Winchester, England) 2011;15(2):1–182. [PMC free article] [PubMed] [Google Scholar]

13) Thomas JG, Bond DS, Phelan S, Hill JO, Wing RR. Weight-loss maintenance for 10 years in the National Weight Control Registry. American journal of preventive medicine. 2014;46(1):17–23. [PubMed] [Google Scholar]