CHAPTER I

INTRODUCTION
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The woman of modern day is busy in her day to day routine work. Scientific instruments and machineries have helped our daily life with ease and comfort. Many technological advancements are intended to eliminate physical exertion from everyday activities. Research findings in the last few years have shown that physical inactivity and negative lifestyle habits are a serious threat to the health of the nation. If an active life style is to be continued in the later years and a relatively high level of physical and physiological functioning is retained as compared to the physically inactive, one has to do some physical activity to protect from the dangerous diseases like obesity, cardio vascular disease, high blood pressure and diabetics.

Unfortunately, many people do not recognize the need for physical activity until they lose health. Only through selected physical activities can one achieve optimal health and well being throughout one’s life span. Physical activities is an essential ingredient for proper functioning of the human organisms for developing health and for preventing certain diseases.

Regular exercise helps to prevent obesity, which is related to both coronary heart disease and hypertension. It helps for mental alertness.
Regular exercise can be an effective way of lowering stress. It maintains emotional stability. It enhances spiritual and moral development. Blood pressure increases heart rate, makes muscles tense and increase blood glucose. Achieving and maintaining physical fitness helps to prevent the premature occurrence of numerous illness and diseases.

Today physicians and exercise physiologist recognize walking and forms of aerobic exercises as key factors in a practice of both prevention and rehabilitisation medicine. While a long term walking program will greatly improve the working efficiency of the lungs, heart and circulatory system and a way excess body fat, it does have certain excessive value limitations as a sole means of achieving total fitness. It does not work to a sufficient extent, the muscle of the abdomen and lower and upper back which are very essential to maintain a good posture. Only weight training and flexibility exercise and to a lower extent cycling, can effectively do this job.

Exercise plays a major role in weight reduction and control with the physical exercise program followed strictly and for a longer period of time. As a result of physical exercise there may not be change in total body weight but body composition will undergo a marked change. Exercise can also lead to substantial weight gains. These gains are often attributed to increase in lean body weight/ mass. Strength and power training program leads to the
largest gains in lean body weight as a result of their relationship with muscle hypertrophy. As the fat store starts depleting, body weight/obesity also follows downward trend. With specific reference to physical exercise, it would appear that the reduction in fat by exercise is slowly the result of an additional expenditure of calories.

**Paula J. Wart (2006)** has explained that if one is under age 35 and healthy, one doesn’t need to see one’s health fitness advisor before starting a moderate-intensity activity program. If one is a male and above 40 (or female and above 50) and plan to begin a vigorous physical activity program, one should consult one’s physician. Other conditions that indicate a need for medical guidance are diabetes, obesity, heart problems, high blood pressure, and family history of early stroke or heart attack, frequent dizzy spells, and extreme breathlessness after mild exertion, arthritis or other bone problems, severe muscular, ligament or tendon problems and smoking. One must remember that vigorous exercise involves minimal health risks for people in good health, or for those following a doctor’s advice. Far greater risks are associated with inactivity and obesity.
Physical Fitness

Definition

Physical fitness is the ability of an individual to live full and balanced life. The totally fit person has a healthy and happy outlook on life. All living individuals have some degree of physical fitness. This degree may be interpreted in terms of their capacity for performance and their endurance in physical activity. Fitness is young man’s absolute necessity. It breeds self-reliance and keeps man mentally alert. This is also essential at all times to make a success in any activity.

Lind and Mcnichal (1987) “Physical Fitness” is the ability to respond to routine physical demands, with enough reserve energy to cope with a sudden challenge.

Carl Gabbard and susan Lowy (1987) states the term physical fitness has taken numerous meanings over the years. General definitions have included the concepts as the ability to function normally without undue fatigue and being able to enjoy leisure time activities without debilitating physical stress. In recent times the term has been divided into two distinct categories skill related and health related fitness. Skill related fitness include speed, agility, co-ordination, power, balance etc. Health related fitness refers to those aspects of physiological and psychological functioning which are
believed to offer the individual some protection against degenerative type of disease and various musculo-skeletal disorders.

United States Department of Health and Human Services (1996)
Physical fitness is the ability to carry out everyday tasks without undue fatigue and with energy left over to enjoy leisure activities and meet unforeseen emergencies.

Peckenpaugh et al (1999) define physical fitness as “the ability to carry out daily tasks with vigor and alertness, without undue fatigue, and with ample energy to enjoy leisure time pursuits and to meet unforeseen emergencies”. Physical fitness increases cardiovascular endurance, muscular strength, stamina and flexibility of muscle and joints in the range of movement. A body that is physically fit utilizes more kilo calories. A physically fit person has a positive outlook and can hope more easily with stress.

“Physical fitness is the ability to carry out daily tasks with vigour and alertness without undue fatigue and with ample energy in leisure pursuits and meet unforeseen emergencies”.


Need and Importance of Physical Activity

Physical activity in this statement is defined as “bodily movement produced by skeletal muscles that require energy expenditure” that produces healthy benefits. Exercise, a type of physical activity, is defined as “a planned, structured and repetitive bodily movement done to improve or maintain one or more components of physical fitness.” The people of today demand even greater attention to physical fitness exercises, nutrition and rest which build quality of physical fitness. That is a pre-requisite for all other activity. As per the above statement we can very well understand the importance of fitness.

Bydcritchell (1986) defines physical fitness as the capacity of your heart, blood vessels and lungs to function efficiently doing vigorous sustained activity such as jogging, swimming and cycling.

Saint Lowis(1989) state physical exercise is any organized activity that involves continuous participation. Exercise occupies a leading role in keeping a person fit. It will be quite difficult to adjust one’s life in terms of stress, diet, and sleep and so on without proper exercise. According to Plato, “Lack of activity destroys the good condition of every human being while movement and methodical physical exercise save it and preserve it.”
Exercise means using and toning the body. Exercise builds and maintains physical fitness.

Erikson et al (1990) state that physical activity of any kind increases the general strength of many body tissues. Bone, muscles, tendons, ligaments and cartilage and all strengthened by physical exercise in addition some of the normal physiological changes associated with age may be minimized or delayed through suitable activity.

Benardot (1993) states that Physical activities also reduce stress and positively affect blood pressure and blood glucose regulation. In addition it aids in weight control both by raising resting energy expenditure and by increasing over all energy expenditure. Overall nutrition influences physical activity, while physical activity influences nutrient use and general health.

National Institute of Health (1995) state that “bodily movement produced by skeletal muscles that requires energy expenditure and produces over all health benefits”.

Pate (1995) with extensive evidence confirms that regular physical activities promotes health and prevent disease.

Blair (1996) state that benefits of regular physical activity include improvement in several aspects of heart function, less injury, better sleep
habits and improvement in body composition (less body fat, more muscle mass).

Venkataramana and Surya kumar (1999) defines physical activity are one of the agencies that promote health. Health is physical, mental, social and emotional. “Health” has been defined by the WHO as “a state of complete physical, mental and social well being and not merely the absence of disease of infirmity”. A sound program of physical education will develop favorable attitude and habits which will be the basis of health.

Risk Factors on Obese Middle Age Group

VanItallie and Simopoulos (1995) people who are obese live shorter lives, because they have a greater risk of early death from cardiovascular disease, stroke, cancer, diabetes, hypertension, and other diseases. As their weight increases, obese patients tend to be at a higher risk for chronic diseases. Males who are 25% or more overweight have 1.3 times the chance of dying from a stroke than normal people (Bouchard, 2000). Obesity has also been linked to several cancers. For example, occurrences of colorectal and prostate cancer are higher among obese men, while endometrial, gallbladder, cervical, and ovarian cancer are more common among women.
Mid life is typically identified chronologically as the years between 40 and 65. There are differences in the aging process among individuals and even among organ systems of the same individual. Inadequate physical activity and poor eating habits may lead to nutritional deficiencies or over nutrition and obesity compromise. Continuing proper food habits and physical activity into mid life and beyond may help minimize the physiologic changes associated with aging. Exercise at mid life can help to maintain an individual’s physiologic status, prevent further declines in function and improve overall well-being.

The high mortality between the ages of 40 to 50 especially in United States among people would indicate either an increasing strain at this period as a result of the growing demands of business and social life. Death in middle life are usually due to the giving out of varies vital part of the body, when subjected to strain, nerveless collapse, high blood pressure and kidney diseases likely to set in at this time.

To meet this period successfully certain precautions need to be observed of course the best insurance against wearing out in middle life is taking an optimum diet and following good habit and hygiene from childhood, thus building a strong body and keeping it in good condition.
Obesity is now-a-days, considered to be somewhat like a disease. It gives rise to many health problems with more weight. More oxygen is required and the lungs have to work harder. Their body makes more carbon dioxide but due to reduced ventilation it does not get out and it remains in the blood, this results in respiratory trouble. A fat person has more blood vessels and so the heart has to overwork, this weakens the heart. His blood pressure generally goes up, she is likely to have higher level of cholesterol and blood lipids, arteries of the heart harden and her heart gets enlarged. The supply of the blood to the heart is less. She runs greater risk of coronary heart diseases and heart failure. Obesity is the result of an imbalance between energy intake and expenditure.

**Overweight**

Overweight refers to increased body weight in relation to height, when compared to some standard of acceptable or desirable weight. Overweight may or may not be due to increases in body fat. It may also be due to an increase in lean muscle. For example, professional athletes may be very lean and muscular, with very little body fat, yet they may weigh more than others of the same height. While they may qualify as "overweight" due
to their large muscle mass, they are not necessarily "over fat," regardless of BMI.

**Causes of Over Weight**

The habit of taking more depends on many factors. If a person is poor, he takes more carbohydrates. Person with easy access to food take more frequently. Person who is worried, dissatisfied, and unhappy or in tension, eats more as a mean to relieve themselves, food for them is a tranquilizer. A person continues with his eating habit even when he grows and does not require the same amount of food. The worst of all is his uncontrolled eating habit acquired either from the family are developed himself due to lack of willpower.

The body’s ability to adjust good intake to body needs can be disturbed by numerous factors, of these, hormones imbalances and glandular defects are believed to be a least importance being demonstrable is only about 5% of all obese individuals.

Although obesity may be familiar, suggestive of a genetic predisposition to fat accumulation, there is also evidence that early feeding patterns impose by the obese mother upon her offspring may play a major role in a cultural rather than genetic; transmission of obesity to one
generation to the next. More generally the distinctive way of life of a nation and the individual’s behavioral and emotional to it may contribute significantly to widespread obesity.

Basal metabolic rate and daily energy expenditure decline with age. This decrease in metabolic function may be either the cause or the effect of associated changes in body composition. Metabolic activity may decline because of decrease in lean body mass and increase in total body fat. Whether the cause or effect energy expenditure and metabolic rate have been found to be highly correlated to body composition. Proper Nutrition and exercise become increasingly important with age because they stimulate metabolic function and prevent obesity and nutrient deficiencies.

Changes in some metabolic process takes place with advancing age. For example, women experience changes in body composition such that there is a greater amount of absolute and relative fat stored in the adipose tissue and there is a tendency to lose lean body mass, especially muscles tissue.

**Obesity**

Obesity is also called corpulence or fatness, excessive accumulation of body fat, usually caused by the consumption of more calories than the body can use. The excess calories then stored as fat, or adipose tissue. Over
weight if moderate is not necessarily obesity, particularly if the individual is muscular or large boned. In general, however a body weighs 20% or more over the optimum tends to be associated with obesity.

The World Health Organization (WHO) has standardized the definition of obesity according to a measurement called the Body Mass Index (BMI). This internationally recognized index uses an individual's body weight (kilograms) and height (meters) to determine his/her risk of obesity. BMI is calculated as follows:

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BMI = \frac{\text{weight (kilograms)}}{\text{height (meters)}^2}
\]

After calculating one's BMI, the result can be compared to the WHO standard classification for obesity: BMI (kg/m²).

<table>
<thead>
<tr>
<th>Classification</th>
<th>Disease Risk</th>
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<tbody>
<tr>
<td>18.5</td>
<td>Underweight Low</td>
</tr>
<tr>
<td>18.5 - 24.9</td>
<td>Normal Low</td>
</tr>
<tr>
<td>25.0 - 29.9</td>
<td>Overweight Increased</td>
</tr>
<tr>
<td>30.0 - 34.9</td>
<td>Obesity I</td>
</tr>
<tr>
<td>35.0 - 39.9</td>
<td>Obesity II</td>
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<tr>
<td>40</td>
<td>Extreme Obesity III</td>
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Obesity may be undesirable from an aesthetic sense, especially in parts of the world where slimness is the popular preference; it is also a serious medical problem. Generally, obese persons have a shorter life expectancy; they suffer earlier, more often and more severely from a large number of diseases than do their normal-weight counterparts. They are also likely to die prematurely of degenerative diseases of the heart, arteries and kidneys. More die of accidents and diabetes and more constitute poor surgical risks than persons with normal weight. Mental health is also affected; behavioral consequences of an obese appearance, ranging from shyness and withdrawal to overly bold self-assertion, may route in neuroses and psychoses.

Moon et al (2002) estimated the body mass index (BMI) distribution of Koreans and examined the relationship between BMI and obesity-related diseases, in particular hypertension and diabetes mellitus. They also attempted to provide primary data to determine suitable BMI cut-off points for obesity in Korea. The 1995 National Health Interview Study (NHIS) data were used to estimate BMI and the prevalence of hypertension and diabetes mellitus. A random sample of 5750 Koreans (15-69 years of age) was investigated. BMI was calculated by self-reported weights and heights. The diagnoses of hypertension and diabetes mellitus were obtained from self-
reported conditions specified in response to consultations with physicians. The mean BMI was 22.6+/−2.6 kg m(−2) for males and 21.7+/−4.8 kg m(−2) for females. The prevalence of hypertension and diabetes mellitus increased with BMI. The odds ratios of the third quartile of BMI (21.9-23.8 kg m(−2)) for hypertension and diabetes mellitus compared with the first quartile were 6.04 and 3.22, respectively. The odds ratio of the fourth quartile (>23.8 kg m(−2)) of BMI was not significantly different from that of the third quartile. The risk of hypertension and diabetes mellitus increased at the third quartile of BMI (21.9-23.8 kg m(−2)), this quartile being much lower than both the current World Health Organization (WHO) BMI cut-off point of overweight of 25.0 kg m(−2), and the 90th percentile proposed in the Monica project, BMI 26.4 kg m(−2). This finding was notable considering the fact that both hypertension and diabetes mellitus occur in Koreans with lower BMIs than whites. Further studies are necessary to identify the BMI cut-off point for obesity in Korea.

*Haddad et al*(2006) states that obesity is actually a pandemic disease by itself, especially by its numerous associated complications. Obesity is considered among the most important cause of morbidity and mortality throughout the world. Its prevalence is variable between countries, but could be estimated to be around 20%. Few data concerning obesity is available in
Lebanon. The objective of this study is to assess the prevalence of obesity in Lebanese patients consulting a primary care medical center in Beirut, as well as to study the links between obesity and other associated diseases.

METHOD: Three hundred and thirteen patients, aged 13 years and above, consulting for the first time between 2000 and 2001 (one-year period), have been included in the study. Obesity is defined by a body mass index (BMI) $\geq 30$ kg/m$^2$, and overweight is defined by a BMI between 25 and 29.9 kg/m$^2$.

RESULTS: Among the 313 patients included, 22.1% were overweight, and 18% obese. The percentage of obesity is significantly higher in patients aged 40 years and above. No difference between men and women was observed. Obesity was significantly related to high blood pressure, diabetes, hypertriglyceridemia, low HDL and ischemic coronaryopathy.

CONCLUSION: Obesity and its associated diseases are frequently encountered problems in Lebanon, as it is in the rest of the world. Wider national studies are needed to define more accurately the magnitude of the problem, in order to apply efficient prevention strategies.

The high percentage of fat in relation to the total body weight may lead to obesity. It is generally believed that normal percentage of body fat for boys and girls should not exceed 15 and 25 percentage respectively.
Values over these are considered to be above normal and may lead to obesity. The amount of fat is determined by two factors:

1. The number of fat strong cells of adiposities
2. The size and capacity of the adiposities

Body fat is defined as enlargement of adipose tissues of the human body. But the excessive enlargement of body's total quantity of fat may be called obesity. This is due to the fat all hypertrophy.

Overeating, addiction, and laziness are other detrimental characteristics of a sedentary life-style. At the same time, we live in a competitive society characterized by pressing domestic problems, business obligations, and deadline tensions. All of these have an impact on the physiological systems of glands and mental state along with your heart, lungs, and all fused into a complex, wonderful organism-your body. Thus, there is dire need, more than at any time in the history of humankind, to seek out regularly to maintain a high level of fitness enables us to enjoy the privilege of snow blowers, automobiles, escalators, and computers.

Donoghue (1985) the most important information obtained from monitoring percent body fat is determining change in muscle tissue over time. "Lean mass" the components that can change that most is muscle
tissue. Therefore, if people monitor its change in muscle tissue can increase (or) decrease depending on a person’s diet activities exercise and life style”.

Losing weight

The first necessity for reducing weight is one’s intension and will power. If this is there, the part becomes easy. One must quite realize the harmful effects of over weight and the necessity to reduce it.

Set a long-range goal first and then set short range goals along the way. Try to take of weight slowly. Steam bath, vibrator and reducing pills are used for reducing weight but these should be used on the advice of a doctor. Emotional stress and strain should be avoided. The most important is to reduce the intake of calories in diet so that they produce less fact and to take regular exercise to consume the fact that is produced or is already accumulated.

Body Mass Index (BMI)

BMI is a common measure expressing the relationship (or ratio) of weight-to-height. It is a mathematical formula in which a person's body weight in kilograms is divided by the square of his or her height in meters (i.e., wt/(ht)^2. The BMI is more highly correlated with body fat than any
other Individuals with a BMI of 25 to 29.9 are considered overweight, while individuals with a BMI of 30 or more are considered obese.

Body weight varies with sex, age, height, skeletal structure, rate of basal metabolism and endocrine peculiarities. It is, therefore, not possible to recommend an ideal weight for an individual. Taking a number of factors into consideration and the data taken from thousand of insurers, life insurance companies have compiled a roach guide-like separately for men and women according to their height.

**Abdominal Muscular Endurance**

Muscular endurance is commonly established by the number of repetition that an individual can perform against a sub maximal resistance or repetition that an individual can perform against a sub maximal resistance or by the length of time that a given contraction can be sustained.

A health related component of physical fitness that relates to the amount of external force that a muscle can exert. Endurance is the ability of a muscle to exert sub maximal force repeatedly over a period of time. Muscular endurance depends to a large extent on muscular strength, and to a lesser extent on cardio vascular endurance. Weak muscles cannot repeated an action several times, nor sustain it for a prolonged period of time. Keeping
these two principles in mind, strength test and training programs have been
designed to measure and develop absolute muscular strength, muscular
endurance or a combination of both.

Over the years it has been well documented that muscle cells will
increase and decrease their capacity to exert force according to the demands
placed upon the muscular system. If specific muscle cells are overloaded
beyond their normal use, such as in strength training programs, the cells will
increase in size, strength, and endurance. If the demands placed on the
muscle cells decreases, such as in sedentary living or required rest due to
illness or injury, the cells will decrease in size and lose strength.

In contrast with cardio respiratory endurance, muscle endurance is
specific to each muscle group. Few tests of muscular endurance for use in
the general population are slowles endurance measures, however, because
most are also tests of muscle strength. Test of muscular endurance and
strength include setups, pushups, the bent-arm hang, and pull-ups. The tests
need to be properly administered and may not discriminate well in some
populations eg. Pull-ups are not suitable for many populations because a
substantial percentage of those tested will have a score of 0). Few laboratory
tests of muscle endurance have been developed.
Body Fat

Jacobson (1989) moderate exercise of long duration such as bicycling, walking etc, result in the conditioning of body, which gets trained to use fatty acids rather than glucose as fuel. This helps to burn body fat.

The unique characteristics of fat may make it more likely than other nutrients to cause obesity, by weight, fat contain 2 ¼ times more calories than to protein and carbohydrates. Dietary fat also appears to be more easily stored by the human body in the form of fat cells.

Kleiner (1997) fat is an important source of energy for light and moderate intensity activity and during long duration aerobic activity. At least 20% energy should be provided by fat in the diets of athletes given the role of fat in providing energy for athletes involved in prolonged low intensity activity.

But most of us could cut our fat intake by half and still consume more fat than we truly need. And eating too much fat may contribute to certain health problems, the most obvious being unwanted weight gain. You can of course become over weight if you eat too much of any of the three types of major nutrients- fat, carbohydrates, or proteins. But fat is the diet which has special characteristics that may make it more likely to cause people to gain weight.
Physical activity is essential for weight management because it burns fat and increase muscle mass to conditions that are metabolically favorable for weight loss, weight maintenance, or prevention of weight regain. As a general rule, exercise does not increase appetite.

**Flexibility**

Werner et al., (1990) define flexibility as the capacity of a joint to move freely through a full range of motion.

Muscles and their attached tendons act as units originating from one bone and attaching to another. They, therefore, are able to influence motion about the joints that they cross, as well as joints above and below in the linked chain of body movements. Although muscle is most often considered to affect joint motion as a result of its ability to shorten, many important functions of muscle involve force production under conditions that do not involve muscle shortening. The length of the activated muscle may not change (an isometric contraction) or the muscle may be lengthened while actively resisting stretch (an eccentric contraction). Muscle that is actively shortening (a concentric contraction) usually causes motion around a joint.

Flexibility or range of motion of joints can be limited by a number of factors in soft tissue. This discussion will be concerned primarily with the muscles as limiting factors of motion in walking compared to the walking
with stretching exercise group. A health related component of physical fitness that relates to the range of motion available at a joint. Flexibility is not a general quality; it is specific to a particular joint, such as the knee or to a series of joints. Such as the spinal vertebra joints. This means that an individual can have a better range of motions in some joints than in others.

The external movements possible at a joint is influenced by the structure of the joint. For example, the elbow and the knee are hinge joints, allowing movements in one direction only; flexion and extension is only the movement possible. In contrast, the shoulder and hip are ball and socket joints; this joint structure allows movement in many directions, usually with great range than the hinge joints. Soft tissues such as muscles, tendons and ligaments greatly influence the range of movement possible at a joint. Flexibility is affected by the length than a muscle can stretch. When muscles are not used, they tend to become shorter and tighter thus reducing the joints range of motions.

**Blood Pressure**

*Donals et al (1987)* states that physical exercise is necessary for better living. Exercise can be used to control blood pressure. Hypertension (High blood pressure) causes an inordinate amount of pressure on the walls of the
arteries. This pressure can result in a rupture of the arteries in the brain which is called stroke. Any hypertensive individual, who exercises regularly, is able to lower his or her blood pressure thereby helping to prevent stroke, one of the leading causes of death in the world.

Blood pressure should be checked regularly, regardless of whether elevation is present or not. Ideal blood pressure should be 120/80 or below. The American heart association considers all blood pressure over 140/90 as hypertension. Regular aerobic exercise, weight control, a low salt low fat diet, smoking cessation, and stress management are the key principles for blood pressure control.

There are some 60,000 miles of blood vessels running through the human body. As the heart forces the blood through these vessels, the fluid is under pressure. Hence, blood pressure is but a measure of the force exerted against the walls of the vessels by the blood flowing through them. Blood pressure is measured in milliliters of mercury and is usually expressed in two numbers, Ideal blood pressure should be 120/80 or below. The higher number reflects the pressure exerted during the forceful contraction of the heart or systole and the lower pressure is taken during the heart’s relaxation, or diastolic phase when no blood is being ejected.
Resting Heart Rate

Hamilton et al (1990) states that oxygen capacity is generally improved through aerobic exercise and the resulting improved through aerobic exercise, and the resulting pulse rate often declines.

Endurance training also tends to lower the resting heart rate (bradycardia). For instance, resting heart rates in highly trained athletes may be as low as or lower than 40 to 45 beats per minute. On the other hand, in healthy but untrained subjects, resting heart rates may be as high as 90 to 100 beats per minute. Thus, the trained subjects are generally characterized as having a low resting heart rate and the untrained as a high resting heart rate.

Cardio Respiratory Endurance

Byrditchell (1996) defines cardio respiratory endurance as the capacity of your heart, blood vessels, and lungs to function efficiently during vigorous sustained activity such as jogging, swimming and cycling.

Cardio respiratory endurance is the ability of the heart, the lungs, and the blood to circulate sufficient oxygen and nutrients to sustain prolonged large muscle activity. The best indicator of Cardio respiratory endurance is maximal oxygen consumption (VO₂ max), the highest capacity to take in and use oxygen during aerobic activity. A high VO₂ max indicates a strong

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cardiovascular system increased capacity to carry out daily activities without discomfort, and reduced risk of death from cardiovascular diseases.

In contrast with cardiorespiratory endurance, muscle endurance is specific to each muscle group. Few tests of muscular endurance for use in the general population are solely endurance measures, however, because most are also tests of muscle strength. Tests of muscular endurance and strength include setups, pushups, the bent-arm hang, and pull-ups. The tests need to be properly administered and may not discriminate well in some populations eg. Pull-ups are not suitable for many populations because a substantial percentage of those tested will have a score of 0). Few laboratory tests of muscle endurance have been developed.

The gold standard or criterion measure, of cardiorespiratory fitness is maximum oxygen uptake or power (VO₂ max) measured in healthy persons during large-muscle, dynamic activity such as walking, running or cycling, it is primarily limited by the oxygen transport capacity of the cardiovascular system. The most accurate assessment of VO₂ maximum is made by the measuring expired air composition and respiratory volume during maximal exertion.

Examples of VO₂ max values for trained and untrained persons.

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Guideline for Exercise in Midlife

There are several physiologic concerns that demand more attention as individuals at all skill levels approach mid life.

The following guidelines may help an individual enhance performance, reduce injuries and improve overall fitness.

1. Maintain adequate strength and flexibility
2. Balance strength between the agonist and antagonist muscle groups to help to avoid muscle and joint injuries.
3. Incorporate both aerobic and strength training to ensure complete cardiovascular and muscular skeletal fitness.
4. Vary training regimen to include both upper and lower body conditioning for complete balanced fitness.
5. Allow time for recovery following an intense or long workout.

Training

Williams (2000) defines “Sports training a process of preparation of sportsman, based on scientific and pedagogical principles for higher performance.

Although the number of people taking part in physical activity and sports in their leisure time has increased, overall physical activity levels
have fallen. This suggests that it is our sedentary lifestyles-taking the car instead of walking or cycling, using lifts or escalators instead of taking the stairs, working long hours in mainly office based occupations –that are contributing most to our lack of activity (www.gillespiem@bhf.org.uk).

Training means preparing for something: an event a season, an athletic competition, a nursing career, an operatic performance, or military combat. Much growth and change occur during training. It usually involves learning or polishing skills, exchanging attitudes and developing and strengthening organs and their functions. When we train, we have something in mind; a goal, a level of competence, a performance of some kind. An aspiration is established in our mind, which we systematically pursue. We get prepared to meet the increasing demands of some of kind with respect to our current mental or physical resources. We seek in some way to change and better our present status, to improve on our previous levels of performance.

Training involves periodic assessment of our status and progress. We have to know pretty much where we are in relation to the behaviour, attitude, or skill for which we seek and change. We also need to develop a clear vision of where we want to be when we want to be when we embark upon a training programme.
Prentice and Bucher (1998) mention the interval training in which bouts of hard running or work are separated by period of light exercise with no pause for rest. Interval training involves intense exercise interspersed with intervals of relatively light exercise. To improve cardio respiratory functioning, strenuous intervals should be allowed at near-maximum heart rate intensity. This form of training usually results in a greater buildup of lactate, accompanied by greater pain and discomfort. However, since the overload principal is applied, that is, the length or intensity of intervals can be increased, great improvement in fitness can occur in a short period of time.

Walking

Forbes (1985) says that weight control is certainly a benefit due to energy expenditure as well as the possibility that aerobic exercise such as walking, swimming and jogging etc., done on protein basis (4-5 times a week) may maintain the basal metabolic rate (BMR) even while he loses weight.

The primary activity to recommend to someone who has been sedentary for a long period of time is times walking. This recommendation is consistent with the introductory material on health benefits, and deals with the issue of injuries associated with more strenuous physical activity. In
addition, there is good reason to believe that some subjects, especially the obese and the elderly may use walking as their primary form of exercise. The emphasis at this stage is to simply get people actively by providing an activity that can be done anywhere, any time, and with anyone, young or old. In this way, the number of possible interfering factors that can result in the discontinuance of the exercise is reduced.

*MacRae et al., (1996)* investigated to determine the effects of a 12-week walking program on walk endurance capacity, physical activity level, mobility, and quality of life in ambulatory nursing home residents who had been identified as having low physical activity levels and low walk endurance capacities. To determine the effects of 12 versus 22 weeks of walk training on walk endurance capacity, physical activity level, mobility, and quality of life in ambulatory nursing home residents. **DESIGN:** Experiment 1: Residents of one nursing home campus were assigned to the walking program, and residents of a second campus were assigned to the social visit control group. Outcome measures were taken before and after 12 weeks. Experiment 2: Pretest/posttest with outcome measures taken before and, again, after 12 and 22 weeks of walking. **SETTING:** Two campuses of the Jewish Homes for the Aging in the Los Angeles area. **PARTICIPANTS:** Experiment 1: Nineteen of 22 residents in the walking group completed the
walking program, and 12 of 15 residents in the control group completed the study. Experiment 2: Thirty of 41 residents (from the two nursing homes) completed the 22-week walking program. **INTERVENTION:** Experiment 1: The walking program involved each resident walking with research staff at his/her self-selected walking pace, 5 days per week for 12 weeks, for a maximum of 30 minutes per day; while the control group had weekly individual social visits, which lasted 30 minutes, from a research assistant. Experiment 2: All residents, those in both the walking and the control group, were offered the opportunity to complete 22 weeks of walking. **MAIN OUTCOME MEASURES:** Maximal walk endurance capacity, the resident's maximum walk time performed in a single day of walking (distance and speed also were measured); physical activity level based on time-sampled observations and physical activity monitors; mobility as measured with the Timed-Up-and-Go test, left handgrip strength, and Tinetti's Mobility Assessment; and quality of life as assessed with the Geriatric Depression Scale (a bodily pain scale) and the Dartmouth Primary Care Cooperative Information Project (COOP) physical work chart. **RESULTS:** Experiment 1: The walking group significantly improved their maximal walk endurance time by 77% and distance by 92%, with no significant change in walk speed; however, the control group showed no significant changes in these variables.
There were no significant group by time interactions on measures of physical activity, mobility, and quality of life. Experiment 2: No further significant changes were found from 12 to 22 weeks in walk endurance capacity, physical activity, mobility, or quality of life. CONCLUSION: Twelve weeks of daily walking at a self-selected walking pace by ambulatory nursing home residents produced significant improvements in walk endurance capacity. No other significant changes were noted in physical activity level, mobility, or quality of life in either group after the intervention. Also, there were no side effects, such as increases in falls or cardiovascular complications, due to the walking intervention. Lengthening the walking program to 22 weeks produced no further significant changes in any outcome measures.

Walking on Fitness

Walking as a moderate exercise has been proved to reduce health risks and prolong life. It has the benefits of fitness walking which really provide the long term health benefits.

Walking aerobically causes the body to take in more air with less effort. The lungs are able to extract more oxygen from the increased air supply and delivers it to the cells where in needed to continue with food to produce energy. The result is an improvement in vital efficiency of the lungs
and the whole cardiovascular system. Not only does it pump blood more efficiently but the total volume of blood actually increases. Blood flow to the muscles and ligaments are strengthened. Joint become more mobile and stronger and also fitness is one of the best forms of relaxation.

The most popular and primitive physical activity of man is walking is walking, less them a century ago man relied upon his two legs for gathering food, hunting and transpiration. Contemporary man uses his leg primarily to play game and fitness activities while walking and jogging have for aspects, it is work and some times very hard work. The great popularity of walking may be attributed to modern means need for strenuous physical activity. It is inherently economical in terms of equipment training facility and training time.

Today physicians and exercise physiologists recognize walking and forms of aerobic exercise as key factors in a practice of both prevention and rehabilitative medicine. While a long term walking programme will greatly improve the walking efficiency of the lungs, heart and circulatory system and primes away excess body fat it does have certain exercise value limitations. As a sole means of achieving total fitness it does not work to a sufficient extent, the muscle of the abdomen and lower and upper back which are very important and essential for maintaining good posture. Only
weight training and flexibility exercise and to a lower extent cycling, can effectively do this job.

**Stretching**

*McNeal and Sands (2006)* states that stretching exercises have been considered an essential component of physical training programs for decades. Cross-sectional studies have demonstrated that flexibility measures are related to performance in many sports, suggesting that using stretching to enhance flexibility may indirectly improve performance. However, observations by athletes and coaches have called into question the universal prescription of stretching for the purpose of enhancing sport performance, and this skepticism is being supported by a growing body of empirical data. Whereas the tissue responses and adaptations to stretching have been the most widely studied area of stretching research, comparatively little is understood regarding the neural influences on range of motion, which may have more applicability when the range of motion needs are related to skilled movements as in sport.

Flexibility is the ability to move muscles and joints through their full ranges of motions. Flexibility is developed by stretching. However, stretching is good only when stretch properly. Some of the many reason why athletes should want to improve their flexibility through stretching exercise.
Benefits of Stretching

Stretching can enhance an athlete’s physical fitness.

1. Stretching can optimize an athlete’s mental and physical relaxation.
2. Stretching can increase an athlete’s learning, practice and performance of many types of skilled movements.
3. Stretching can promote an athlete’s development of body awareness.
4. Stretching can reduce an athlete’s risk of joint sprain or muscle strain.
5. Stretching can reduce an athlete’s risk of back problem.
6. Stretching can reduce an athlete’s muscles soreness.
7. Stretching can reduce the severity of painful menstruation of female athletes.
8. Stretching can reduce an athlete’s muscular tension.

Different Methods of Stretching

Just as in the proverbial “there is more than one way to skin a cat,” there is also more than one way to stretch your muscles. Stretching refers to the process of elongation. Stretching exercise is performed in a variety of ways depending upon your goals, abilities and state of training. For example a world class gymnast or black belt in karate should perform more advanced stretches than individual who are beginning stretching program simply to
improve their personal health and fitness. There are five basic techniques, static, ballistics, passive, active and proprioceptive.

**Static Stretching**

Static stretching involves holding a position that is you stretch to the farthest point and hold the stretch. Splits are a good example of static stretching. The most important advantage of static stretching is that it is the safest method of stretching. Other advantage includes these:

1. It requires little expenditure of energy
2. It allows adequate time to reset the sensitivity of the stretch reflex.
3. It permits semi-permanents change in length.
4. It can induce muscular relaxation via the firing of the GTO’s if the stretch is held long enough.

**Ballistic Stretching**

Ballistic stretching involves bobbing, bouncing, rebounding and rhythmic types of movements. This technique is the most technique controversial stretching method because it can cause the most soreness and injury. Other disadvantages are these:

1. It fails to provide adequate time for the tissues to adapt to the stretch.
2 It initiates the stretcher flex and thereby increases muscular tension making it more difficult to stretch out the connective tissues.

3 It does not provide adequate time for neurological adaptation to take place.

Despite these disadvantages, there is several reason why some athlete’s might use ballistic stretching exercise. This method is effective for developing flexibility more importantly; in terms of specificity of training it is appropriate for developing dynamic flexibility.

**Passive Stretching**

Passive stretching is a technique in which you are relaxed and make no contribution to the range of motions. Instead, an external force is created by an outside agent, either manually or mechanical. The advantages associated with passive stretching are as follows:

1. It is effective when the agonist is too weak to respond.
2. It is effective when attempt to inhibit tight muscle or unsuccessful.
3. It allows stretching beyond one’s active range of motion.
4. Direction, duration and intensity can be measured when more advanced stretching machines and modalities are used in rehabilitative therapy.
5. It can promote team comradely when athletes stretch with partners.
Active Stretching

Active stretching is accomplished using your own muscles and without any assistance from external force. An example of active stretching is standing upright and slowly lifting one leg to a 45 degree angle. Active stretching is important because it develops active flexibility, which in turn has been found to have a higher correlation with sports achievements than does passive flexibility. The major disadvantages of active stretching are that, it may initiate the stretch reflex and that it may be ineffective in the presence of certain dysfunctions and injuries such as severe sprains, inflammations or fractures.

Proprioceptive Neuromuscular Facilitation

It is another broad strategy that can be implemented to improve your range of motion. This technique is also referred to in certain discipline as a muscle energy technique. PNF was originally designed and developed as a physical therapy for the rehabilitation of patients. Today, several different types of PNF are being used in the arena of sports medicine. Two of the most prevalent are the contract relaxation techniques and the contract relax and contract technique.
The Present Study

Obesity is the mother of all diseases. People who are obese live shorter lives, because they have a greater risk of early death from cardiovascular disease, stroke, cancer, diabetes, hypertension, and other diseases.

Research findings in the last few years have shown that physical inactivity and negative lifestyle habits are a serious threat to the health of the nation.

Hence the importance of treating obesity to prevent increased occurrence in India needs greater attention from all concerns.

Exercise and physical activity don’t simply burn calories; they also have number of other positives effects. Exercise is an essential component of good health. Exercise occupies a leading role in keeping a person fit. It will be quite difficult to adjust one’s life in terms of stress, diet, and sleep and so on without proper exercise. Exercise means using and toning the body and maintains physical fitness. Hence, the investigator has attempted to find out the physical and physiological responses resulting from walking and walking with stretching exercise program on middle-aged obese women.
Statement of the Problem

The main purpose of the study is to assess the physical and physiological responses resulting from walking and walking with stretching exercise program on middle aged obese women. The subordinate purpose of the study is to determine whether walking or walking with stretching exercise would have greater effect on selected physical and physiological responses on middle aged women.

Hypothesis

The following hypotheses are framed for this study.

1. There may be a significant reduction in Body Mass Index, Percent Body Fat, Systolic Blood Pressure, Diastolic Blood Pressure and Resting Heart Rate for both experimental groups such as walking and walking with stretching exercise groups as compared to control group.

2. There may be a significant increase in Abdominal Muscular Endurance, Flexibility and Cardio Respiratory Endurance for walking and walking with stretching exercise groups as compared to the control group.
3. The reduction in Body Mass Index, Percent Body Fat, Systolic Blood Pressure, Diastolic Blood Pressure and Resting Heart Rate may be higher for walking group than walking with stretching exercise group.

4. The increase in Abdominal Muscular Endurance, Flexibility and Cardio Respiratory Endurance may be higher for walking group than walking with stretching exercise group.

**Delimitations**

Prior to the test, the investigator made a survey among the 30 to 50 years women of Coimbatore city to find out their level of obesity. The investigator with the help of various wards representatives and by observation selected 150 obesity women between the age group of 30 to 50 years and explained to them about the purpose and nature of the study and requested to co-operate for the study.

1. Study is delimited to middle aged obese women in the age group of 30 to 50 years in Coimbatore.

2. The selection of the subject was done through the medical examination in order to avoid cardio pulmonary diseases. Documental metabolic diseases and hyper tension systolic blood pressure (160mmHg) were not included in the study.
3. The forty five subjects were divided randomly into three groups of fifteen each, out of which group I (n=15) underwent walking, Group II (n=15) underwent walking with stretching exercise and Group III (n=15) remained as control for twelve weeks.

4. The criterion variables tested were Body Mass Index, Abdominal Muscular Endurance, Flexibility, Percent Body Fat, Blood Pressure (Systolic and Diastolic), Resting Heart Rate and Cardio Respiratory Endurance.

Limitations

1. Metrological factors were not taken into consideration.

2. Certain factors like life style, daily routines work, diet and other factors which may have an effect on the result of the study were not taken into consideration.

3. During the training period psychological stress and other factors, which affect the metabolic function, were not taken into consideration.
Significance of the Study

Benefits of regular exercise helps to prevent obesity. It may be possible to maintain that the data formulated with a reasonable level of accuracy and specificity could be useful for fitness trainees and medical experts. To put it briefly, the study becomes significant in the following ways:

1. The study will help to evaluate the effect of walking, walking with stretching exercise program on the selected variables of the study.
2. The study may serve as a guide to observe people and make them aware of the importance of walking and walking with stretching exercise program.
3. The study will be useful for physical education teachers and coaches to identify and select appropriate exercise program to reduce obesity in health clubs to frame separate fitness program.
4. The study will create an awareness of their body physical and physiological characteristics and their efficiency.
Definition of the Terms in this Study

Walking

Human walking is a process of locomotion in which the erect, moving body is supported by first the leg and then the other. As the moving body passes over the supporting leg, the other leg is swinging forward in preparation for its next support base on the foot and the other always on the ground, and during that the period of the body is transferred from the trailing to the leading leg there is a brief period when both feet are on the ground. As a person walk faster these period of double support become smaller and smallest fraction of the walking cycle.

Stretching Exercise

Stretching refers to the process of elongation. Stretching exercise is performed in a variety of ways depending upon your goals, abilities and state of training. Stretching program is simply to improve their personal health and fitness. Regular program of stretching exercise will help to attain and maintain the flexibility needed from every day activities and make more graceful. From adolescent onward the joints have a tendency to loose mobility. By putting main joint of our body through their full range of
motion, one can be in good condition and domains and esthetics. Stretching routine strengthens and loosen muscles which are helping to relax.

**Body Mass Index (BMI)**

The BMI is considered as one of the simpler tools that more accurately determines appropriate body weight. The formula used for the BMI was developed over a hundred years ago by a mathematician named quetlet. As only a mathematician he realized that dividing a person’s weight in kilograms by the square of the height in meters gives a better sense of a body proportion

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\text{BMI} = \frac{\text{Weight (in kg)}}{\text{Height (m)}^2}
\]

therefore the BMI was calculated by using the above formulae.

**Obesity**

Obesity is called corpulence or fatness, excessive accumulation of body fat, usually, caused by the consumption of more calories than the body can use. The excess calories is then stored as fat, or adipose tissue. Over weight, if moderate, is not necessarily obesity, particularly if the individual is muscular or large boned. In general, however a body weights 20 percent or more over the optimum tends to be associated with obesity.
**Height**

The height of subject is measured in centimeters in standing position. A height scale in centimeters may be fastened to a wall or black board. The subject stands erect with his heel, buttocks and upper back contacting the scale. The chin is tucked in slightly and the head is held erect. It is the measurement from top of the head to the heel in standing position.

**Weight**

The degree of heaviness of a thing especially as measured on a balance, weighing machine etc., and expressed according to a particular system of measuring.

**Abdominal Muscular Endurance**

Abdominal muscular endurance is the ability of a muscles or group of muscles to maintain in a sub-maximal contraction over a period to time where single muscle contribution and relaxation required movement repeatedly for longer time without fatigue.

**Body Fat**

Body fat is determined from the difference between body weight and fat free mass.
Flexibility

Flexibility is defined as the functional capacity of the joints to move through a full range of movement.

Blood Pressure

Blood pressure is defined as the pressure at which the blood flows in the arteries.

Systolic Pressure

The pressure exerted on the vessel walls during ventricular contraction, measured in millimeters of mercury by the sphygmomanometer.

Diastolic Pressure

The pressure exerted by the blood on the vessel walls during the resting portion of the cardiac cycle, measured in millimeters of mercury by a sphygmomanometer.

Resting Heart Rate

The heart beat or frequency of heart beats in one minute where one being in resting condition.
Cardio Respiratory Endurance

It is the capacity of your heart, blood vessels, and lungs to function efficiently doing vigorous sustained activity such as jogging, swimming and cycling.