THE EFFECTS OF HTEE RUE EXERCISE PROGRAM TO ENHANCE HEALTH RELATED FITNESS FOR OVERWEIGHT STUDENTS AT THAI-MYANMAR BORDER

HTEE RUE -

A Thesis Submitted to the Graduate School of Naresuan University

in Partial Fulfillment of the Requirements

for the Master of Education in Physical Education and Exercise Science - (Type A2)

2024

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Thesis entitled "The Effects of Htee Rue Exercise Program to enhance Health Related Fitness for overweight students at Thai-Myanmar Border"

By Htee rue -

has been approved by the Graduate School as partial fulfillment of the requirements

for the Master of Education in Physical Education and Exercise Science - (Type A2) of Naresuan University

Oral Defense Committee

..... Chair

(Assistant Professor Satin Prajanban, Ph.D.)

..... Advisor

(Assistant Professor Phong-ek Suksai, Ph.D.)

..... Co Advisor

(Associate Professor Pufa Savagpun, Ph.D.)

..... Internal Examiner

(Assistant Professor Arphat Tiaotrakul, Ph.D.)

Approved

.....

(Associate Professor Krongkarn Chootip, Ph.D.)

Dean of the Graduate School

Title	THE EFFECTS OF HTEE RUE EXERCISE PROGRAM TO ENHANCE HEALTH RELATED FITNESS FOR OVERWEIGHT STUDENTS AT THAI-MYANMAR BORDER
Author	Htee rue -
Advisor	Assistant Professor Phong-ek Suksai, Ph.D.
Co-Advisor	Associate Professor Pufa Savagpun, Ph.D.
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ABSTRACT

This document summarizes some of the existing research about overweight among students. This is mainly concerning the negative impacts of poor diet and the positive impacts of exercise. It then applies this research to the situation at Thoo Mweh Khee Learning Centre, a migrant school in Thailand, near the Thai/Myanmar border. Most students at the school cannot access the Thai school system because they don't have Thai ID documents or because they cannot speak Thai language. The students are from the Karen ethnic group who are natives to Eastern Myanmar, across the border from the school and teaching up to Grade 10 is in the Karen language. The research selected one grade from the school (Grade 12) and analysed the bodyweight of the students. It uses a BMI of 23 or above to identify those students who are overweight. They represent just under 13% of the students or 1 out of every 8 students. It identifies that these students have very limited knowledge about the benefits of health-related fitness, target weight levels or contributing factors such as diet or exercise. The result is that their diet is high in fats/oils and sugars. Their free time is used for Facebook, online activities, study, and other sedentary activities such as watching movies. It concludes that a programme of exercise including Cardio-vascular and flexibility exercises, muscular strengthening, and endurance, and measuring body composition (BMI) would help. Whilst this addresses the exercise needs of the students, programmes could be developed to

tackle other parts of the issues identified. For example, a dietary programme could be added to the exercise programme in the future. The present research recognizes that the overeating and/or the way they use their free time may reflect other underlying issues, such as having traumatic experiences in the past due to the ongoing war in the Karen ethnic area of Myanmar, or to other physical or emotional causes. It has not tried to analyse these deeper issues but identifies that further research in this area would be useful.

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Htee rue -

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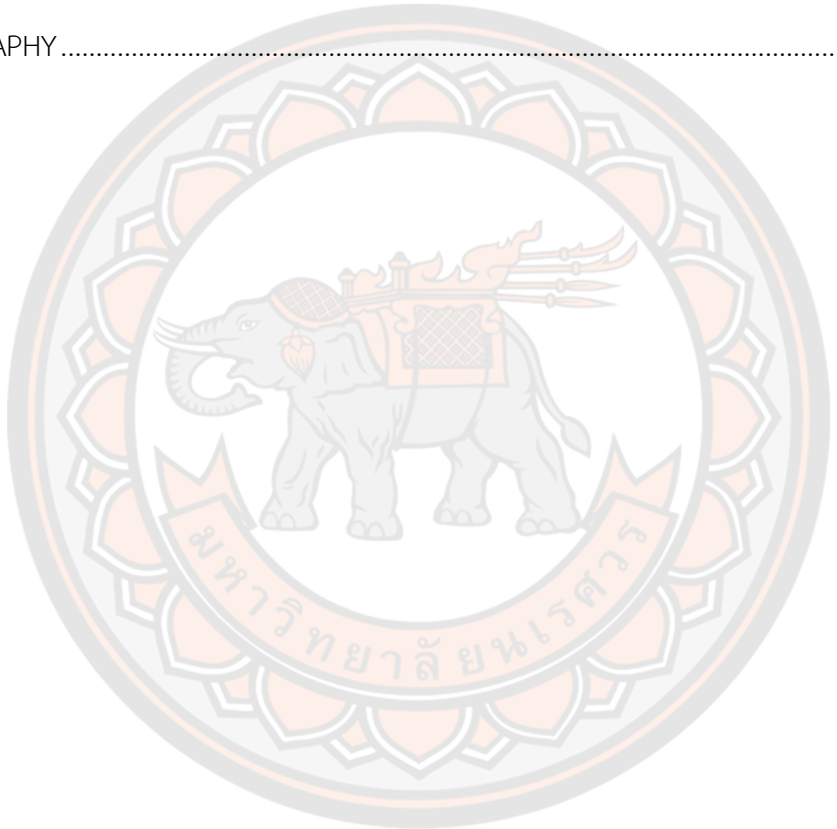

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Chapter 1

Research Background

Introduction

Physical fitness is defined as a set of attributes or characteristics individuals have or achieve that relates to their ability to perform physical activity. These characteristics are usually separated into health-related and skill-related components of physical fitness. Health-related physical fitness components are cardiorespiratory endurance, muscular strength, muscular endurance, body composition and flexibility. Cardiorespiratory endurance is the ability of the heart and lungs to supply oxygen during sustained physical activity. Muscular strength is the ability to exert force, and muscular endurance is the ability to continue to perform without fatigue. Body composition is the relative amount of muscle, fat, bone, and other vital parts of the body. Flexibility is the range of motion available at the joints. (Berduszek RJ, Geerdink H, van der Sluis CK, Reneman MF, Dekker R. 2021).

Childhood obesity is one of the most important public health concerns of the 21st century (World Health Organization [WHO], 2013). As childhood obesity is on the rise, researchers are coming to terms with the increasing risks that overweight and obesity. Pose for children's health (Daniels, 2006). These risks include both immediate and long term, physical and mental health risks. Ultimately, overweight children are more likely to become obese adults (Phillips, 2012), moving up the development of obesity related diseases, such as cardiovascular disease (American Obesity Treatment Association, 2013). Present health concerns also include type II diabetes mellitus (Centres for Disease Control and Prevention [CDC], 2013) and asthma, as well as other physical health problems with their gastrointestinal and skeletal systems (Daniels, 2006). Overweight children are also more likely to suffer from mental health problems and overall psychological stress (Must & Strauss, 1999).

Background and Significance of the Study

Thoo Mweh Khee (TMK) learning center founded in 2002 on the Thai/Burma border, TMK provides education to over 600 predominantly Karen students from Burma. Beginning in nursery school and continuing to post-high school, the school offers a wide variety of educational opportunities and experiences to disadvantaged youths from Burma. Coming from communities impoverished by years of government neglect and oppression, the students yearn for education and future opportunities it presents. TMK is a safe, evolving, vibrant environment. TMK was established in response to the needs of Karen refugee children and youth from Karen State, Burma, and children of Karen migrant workers along this part of the border to access primary and secondary education. Without any Thai identity and the inability to speak Thai, these children and youth could not attend Thai schools, and schools in the conflict areas of Karen State, Burma seldom proceed past Grade 4. This learning center was officially opened on 15 August 2002. At that time TMK comprised of only two kindergarten classes and one Grade 1 class and consisted of four teachers and 79 students. In 2003, enrollment increased to 198 students with 7 teachers and classes going to Grade 5. Since that time, each year the numbers of students have increased, as has an extra grade each year with the school achieving the first Grade 10 graduation in March 2009. In 2019, there were nearly 1200 students enrolled with 40 teachers and classes from Nursery to 12 Grade as well as a Bachelor of Liberal Arts program. (Thoo Mweh Khee learning Center, 2022).

Overweight problems in grade 12 students, the students are eating regally food, high-calorie foods, such as fast foods, baked goods, and vending machine snacks, can cause the students to gain weight and obesity. Candy and desserts also can cause weight gain, and more and more evidence point to sugary drinks, including fruit juices and sports drinks, as culprits in obesity in some students. Behavior of teenagers in obesity, sleep is an important contributor to physical and mental health, however chronic sleep deprivation has been become common in teenagers. Most of the teenagers spend a lot of their times such as (playing computer games or use social median). If the teenagers have short sleep duration, poor sleep quality and

late bedtime are all related with extra food intake, poor diet quality and obesity in teenagers. (Chaput J.P. & Dutil C., 2016).

Unhealthy dietary habits and lack of exercise are among the most common causes of teenage obesity. Teenagers are at particular risk of spending too much time on sedentary activities, such as watching television or using mobile devices like phones and tablets. Teenagers spend upward of seven hours a day on a screen, while many experts suggest that children should be limited to no more than two hours of screen time a day. Conversely, practicing healthy behaviors, such as eating a balanced diet and getting enough exercise, are key to helping teenagers prevent and overcome obesity. Obese teenage also have a greater risk for severe illness from COVID-19 infection, according to the American Academy of Pediatrics. In addition to physical health, obesity can negatively impact a teenager's emotional health. Social stigmas related to being overweight may subject obese teenagers to low self-esteem and bullying, which can lead to poor school performance and persistent psychological problems such as anxiety and depression. When the teenage eat more calories than they use, their bodies store the extra calories as fat. A couple pounds of extra body fat usually doesn't cause problems for most people. But when people keep up a pattern of eating more calories than they burn, more and more fat builds up in their bodies. (Norwich University online, 2021).

Sedentary is someone who spending a lot of times on sitting down, and not moving or exercise very much. The students who are living a sedentary lifestyle is often sitting or lying down. They don't do a lot of activities. They are spending several times on watching TV, playing video games, reading, or using a mobile phone or computer for much of the day. A sedentary lifestyle can contribute to obesity. Sedentary behavior refers to activities that use very little energy while being awake. Examples of sedentary behavior include sitting for long periods, watching television, riding in a bus or car, playing passive video games, playing on the computer, and sitting in a car seat or stroller. (KFL & Public Health, 2020). The students who don't exercise much are more likely to gain weight because they don't burn as many calories. They don't do any exercise and, they don't really understand the benefit or important of doing exercise. Therefore, they spend their time, such as watching

television, playing video games, and using Facebook also contribute to the problems. Some of the students comes from a family of overweight people, he or she may be more likely to put on weight. This is especially true in an environment where high-calorie foods are always available and physical activity isn't encouraged. Personal, parental and family stress can increase a child's risk of obesity. Some of the students overeat to cope with problems or to deal with emotions, such as stress, or to fight boredom. Their parents might have similar tendencies. (Mayo Clinic Staff, 2020).

Teenage are increasing weight because of unhealthy food choices (like fast food) and family habits (like eating food in front of the TV). High-calorie, low-nutrient snacks (like chips, cookies, and ice cream) and beverages (like soda, juice, and sports drinks), bigger portions of food, and less-active lifestyles are all contributing to the obesity epidemic. And the students who don't get enough sleep also are more likely to be overweight. There seems to be a converse relationship between sleep and obesity. Not only can being overweight or obese negatively affect your sleep through sleep apnea and restless legs syndrome, but certain sleep problems may contribute to obesity. Sleep and childhood obesity. Dozens of studies spanning five continents have looked at the link between sleep duration and obesity in children. Most (but not all) have found a convincing association between too little sleep and increased weight. The strongest evidence has come from studies that have tracked the sleep habits of large numbers of children over long periods of time (longitudinal studies) and have also adjusted for the many other factors that could increase children's obesity risk, such as parents' obesity, television time, and physical activity. (Harvard T.H. Chan School of Public Health, 2022).

The main cause of childhood obesity in Thoo Mweh Khee Learning Center (TMK) is a combination of eating too much and exercising too little. A poor diet containing high levels of fat or sugar and few nutrients can cause kids to gain weight quickly. Fast food, candy, and soft drinks are common. Culprits. Convenience foods, such as frozen dinners, salty snacks, and other food that have a lot of calories, can also contribute to unhealthy weight gain. Some children develop obesity because their parents don't know how to choose or prepare healthy foods. Other families may not be able to easily afford fresh fruits, vegetables, and meats. They are eating

large amounts of processed or fast food – that's high in fat and sugar. Eating out a lot – some of the students may be tempted to also have a starter or dessert in a restaurant, and the food can be higher in fat and sugar. Eating larger portions than you need – some of the students may be encouraged to eat too much if their friends or relatives are also eating large portions. Drinking too many sugary drinks also including soft drinks and fruit juice can cause overweigh and obesity.

Lack of physical activity is another important factor related to obesity. Many people must study that involve sitting at a desk for most of the day. They also rely on their cars, rather than walking or cycling. For relaxation, many students tend to watch TV, browse the internet or play computer games, and rarely take regular exercise. Not enough physical activity can be another cause of childhood obesity. Most of the students gain weight when they’re less active. Exercise burns calories and helps you maintain a healthy weight. Children who aren’t encouraged to be active may be less likely to burn extra calories through sports, time on the playground, or other forms of physical activity. (Mayo clinic staff, 2021). The students who study in TMK, they have never been studying about health-related fitness, because school also have never been teaching health related fitness to the students. As a result, we want the students to understand and learn health related physical fitness. We also want them to have experiences and get knowledge to be able to assist their self and their communities in the future.

Health-related physical fitness components are cardiorespiratory endurance, muscular strength, muscular endurance, body composition and flexibility. Cardiorespiratory endurance is the ability of the heart and lungs to supply oxygen during sustained physical activity. Muscular strength is the ability to exert force, and muscular endurance is the ability to continue to perform without fatigue. Body composition is the relative amount of muscle, fat, bone, and other vital parts of the body. Flexibility is the range of motion available at the joints. (Redmar J Berduszek, Henk Geerdink, Corry K van der Sluis, Michiel F Reneman & Rienk Dekker, 2021).

Flexibility allows your body to move through a range of motion. Good flexibility can improve range of motion and allow for better, more functional movement. Working to become more flexible has many benefits aside from

improving range of motion, such as reducing fatigue and improving overall well-being. But many people tend to overlook the importance of flexibility, assuming it is only for those looking to boost sports performance. Incorporating flexibility training into your day could lead to improved fitness for everyday activities and enhanced overall health and well-being. If you frequently experience muscle fatigue, muscle stress, or poor joint health, these could be signs that you could significantly benefit from flexibility exercises. Many times, people confuse flexibility with range of motion. Range of motion (ROM) is the movement of a joint without pain in all directions possible. Flexibility is the ability of the muscles, ligaments, and tendons to elongate through the ROM. Using flexibility exercises to improve your range of motion helps decrease your risk of injuries and avoid tightness and soreness around your joints. Plus, having a good range of motion can impact your other workouts and activities. For instance, you are more likely to use proper form and activate your muscles, making your exercise safer and more effective. One way to improve flexibility is through regular stretching exercises. You should stretch as part of a consistent workout routine, but you should also stretch after exercising. Even stretching after sitting in your office chair for an extended period is essential. Poor flexibility can impact your health and well-being in several ways. You may experience muscle fatigue, stress on your muscles, and inadequate joint health. Increasing your flexibility helps you avoid these problems and reap various benefits. (Nicole LaMarco, on Jun 02, 2022).

Cardiovascular fitness relates to the ability of the heart, blood, blood vessels and the respiratory system to sup-ply oxygen and necessary fuel to the muscles during physical activity. The best type of physical activity for improving cardiovascular fitness is aerobic activities. Aerobic activities are those which force the body to use a large amount of oxygen for a sustained period. Sustained means that the physical activity should be done for a period of 15 to 30 minutes to get the aerobic benefits. Examples of aerobic activities are jogging cycling, swimming, rope jumping, and aerobic dance. Certain sports like basketball and soccer also provide the workout needed to achieve an aerobic training effect. Aerobic activities provide a safeguard for your physical and mental health. Cardiovascular fitness can be

measured in several ways. The most accurate measurement is a stress test performed on a stationary bicycle or treadmill. The most common test is the one mile run for time. Cardiovascular fitness is the most important aspect of physical fitness because of its potential to reduce risks of developing chronic diseases.

Muscular strength and endurance are closely related components that are very important to kid your age. Muscular strength is the ability of a muscle group to apply a maximal force against a resistance one time. Muscular strength is the ability of a muscle group to exert force or lift and carry weight. The stronger your muscles, the heavier weight you can lift and move. To ensure well-rounded muscular strength, it's important to prioritize muscular strength training of all major muscle groups like legs, arms, core, shoulders, back, and hips. Exercise for Muscular strength are Push-ups, sit-ups, pull-ups, squats, Rucking, Running. Ideally, try to add strength training to your workout program at least 2–3 times per week. Being physically strong helps you move and lift heavier objects with ease, which can make day-to-day tasks much easier. Muscular endurance is the ability to repeat muscle movement for a long period of time. Unlike muscular strength, which measures how much weight you can lift or move, muscular endurance tests how long your muscles can withstand an exercise. Using your muscles for long periods of time, like cycling, running, swimming, or stair climbing, relies on muscular endurance to keep you going. The more you train, the longer your muscles can go before reaching fatigue. Muscular endurance is how long your muscles can endure an exercise. It's important for longer duration exercise as it allows you to withstand exercise for longer without getting fatigued. In the past young men were much more interested in muscular development than young women. That gap is closing rapidly, as young women are realizing the importance of developing their muscular fitness. To-day, more than ever before, women want to have well-toned muscles. An important fact to remember though is that young women cannot develop the large muscles for the simple reason that they do not have enough of the necessary hormone testosterone. Young men on the other hand have high levels of testosterone, enabling them to greatly increase their muscle size. Regardless of your gender, improving your muscle development will improve your overall fitness. The partial sit-up test can be used to measure

abdominal strength. Push-ups, pull-ups, and the flexed arm hang are used to measure muscular strength and endurance of the upper body. (Audrey, on July 30, 2022).

Body composition is the ratio of fat to muscles, bone, and other tissues that compose your body. A certain amount of body fat is necessary for good health. Extremely high or low amounts of fat can cause health problems. Most young adults desire a low percentage of body fat. However, your health may suffer if your percentage of body fat is too low or high. Looking good and feeling good depends a great deal on making sure you have the correct amount if body fat. Body composition can be correctly evaluated in several ways. Although underwater weighing is the most accurate, it is also the most expensive means to measure body fat. Body composition is most assessed by a device called a skinfold caliper. However, there are also several body composition measurement devices on the market which can give you a general measurement. The benefit of understanding cardiorespiratory endurance, muscular strength, muscular endurance, flexibility, and body composition, known as the Five Components of Fitness, is immeasurable and is important for improving health and performance. Key vocabulary words that will be introduced during this unit are Body Composition: The combination of fat mass and fat-free mass, including fat, bones, muscles, organs, and water. Cardiorespiratory Endurance: The ability of the heart, blood, blood vessels and lungs to supply oxygen to the muscles during long periods of physical activity. Flexibility: The muscles' ability to move a joint through a full range of motion. Muscular Endurance: The ability of the muscles to repeat a movement many times or hold a position without stopping to rest. Muscular Strength: The ability of a muscle or muscles to push or pull with its total force. (Lake Washington School District, 2021).

From the research and article about learning center, obesity and overweight was point that teenager need health-related program for their quality of life. The researcher was interested in developing health-related program on weight control for teenage in learning center for human wealth advantage and quality of life.

Purposes of the Study

To compare the before and after situation resulting from the experimental Htee Rue exercise Program to enhance Health Related Fitness for overweight students at the Thai-Myanmar Border.

Statement of the Problems

The problems of the overweight in Thoo Mweh Khee learning center (TMk), the students are unhealthy dietary patterns, together with a sedentary lifestyle and lack of exercise, contribute to the students overweight and obesity. The sedentary lifestyle is the most predominant one in the developed world today. Many of the Thoo Mweh khee students typically spend more time than ever in front of screens, rarely engaging in physical activities. The reason for the unsuccessfulness of previous health interventions could be the lack of understanding how overweigh and obese people consider themselves regarding their weight. There is no curriculum which encourage the students to attend physical education lessons, both within the training sessions, and during extracurricular activities. Also, there is no PF teachers who will teach physical activities.

Scope of the Study-

This study will be used for qualitative research. The study focuses on the Grade 12 students from Thoo Mweh khee Migrant Learning Center who are overweight. This study will provide the necessary health-related fitness program to this target group. This paper will analyze the effect of the Htee Rue exercise program to enhance health related fitness. This study is important for the students to understand and get knowledge of health-related fitness programs and physical activity.

Research definition

Health-related Physical Fitness (HRPF) is theoretically defined as a multidimensional construct containing the components 1) cardiorespiratory endurance, 2) muscular strength, 3) muscular endurance, 4) flexibility and 5) body composition. HRPF involves exercise activities that you do to try to improve your physical health and stay healthy, particularly in the categories of cardiovascular endurance, muscular strength, flexibility, muscular endurance, and body composition.

Cardiovascular Endurance is a measure of how well you can do exercises that involve your whole body at moderate to high intensity for an extended time. Improving your cardiovascular endurance can make it easier for you to carry out your daily tasks.

Muscular Endurance is the ability of a muscle or group of muscles to perform repetitive contractions against a force for an extended period of time. The greater your muscular endurance the higher number of repetitions you can complete.

Muscular Strength is the ability to exert force against a resistance enabling you to push, move or lift objects. Greater muscular strength means we can lift, push, or pull more.

Flexibility is the ability of a joint or series of joints to move through an unrestricted, pain free range of motion. Although flexibility varies widely from person to person, minimum ranges are necessary for maintaining joint and total body health.

Body Composition is the amount of fat tissue relative to other tissue in your body. Your body composition is based not on how much you weight, but rather on how much of your weight is fat as opposed to muscle.

Thoo Mweh exercise program is program that aims to improve health related fitness for overweight students made up of 8 programs.

Hypotheses of the Study

After following the Htee Rue exercise Program the overweight students' health related fitness will be better than before the experiment. .05 level.

Research Framework

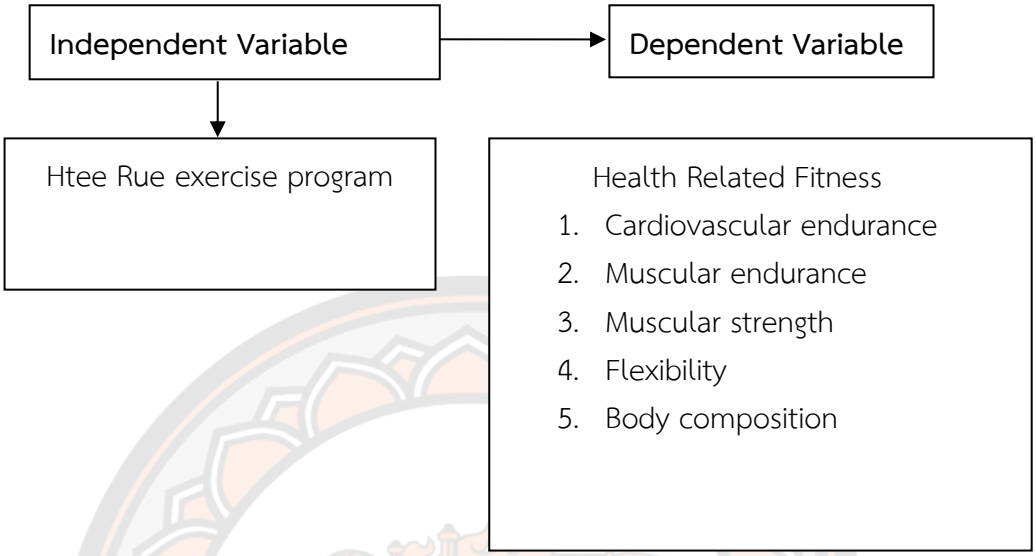

Figure 1 Research Framework

Chapter 2

Literature Reviews

Definition of Health-related fitness

Health-related physical fitness is primarily associated with disease prevention and functional health. Participating in regular health-related fitness helps you control your weight, prevents diseases and illness, improves your mood, boosts energy, and promotes better sleep. It is made up of five sections: cardiovascular endurance, muscular strength, muscular endurance, flexibility, and body composition. Let’s take a closer look at the five sections of health-related fitness:

Cardiovascular endurance means the effective coordination of the lungs and heart to provide fuel and oxygen to the body during times of sustained workload. Effective execution of cardiovascular exercises improves the elasticity of the blood vessels, heart's contraction strength, and blood efficacy in carrying oxygen. Trainers use Step Test and Cooper Run to assess the cardiovascular endurance of the trainees.

Flexibility, although often overlooked, flexibility is the most vital parameter of physical fitness. Insufficient flexibility makes the growth of the joints and muscles stiff, limiting one's movement. Flexibility training allows the body to move through its fullest motion range without facing stiffness or pain. It plays a vital role in unhindered movement and affects one's agility, coordination, and balance. Perfect motion reduces the risk of injury and improves athletic performance, directly impacting one's fitness.

Muscular Strength The maximum amount of force a muscle can produce is muscular strength. It is the power that helps you lift or carry heavy objects in a single go. Resistance training like bodyweight exercises, weightlifting, and resistance band exercises help improve muscle strength. Climbing hills, cycling, and running are also better ways to enhance muscle strength. One-rep-max is the common way to test one's muscular strength. Improved muscle strength promotes physical fitness as it prompts the body to use more calories to burn fat.

Body composition is the most crucial component of physical fitness. It is the ratio of lean mass to the amount of fat in the body. Lean mass is the total body mass of bones, muscles, and organs. It is also known as the BMI or Body Mass Index, a ratio yardstick to analyses one's physical fitness. High composition of fat increases the risk of heart complications and heart disease.

Muscular endurance is the ability of muscles to perform activities without feeling fatigued. This physical fitness involves multiple repetitions of any exercise, whether resistance training, weight training, or enhancing cardiovascular endurance. The better the muscle endurance, the less fatigued you will feel. (Ambika Luthra, 2022)

Accordingly, a definition of health-related fitness (HRF) was proposed by Deli, Bakle and Zachopoulou, (2006), who suggested that HRF is a multidimensional construct comprising five components). Specifically, these five components are CRE, muscular strength (MS), muscular endurance (ME), flexibility, and body composition. CRE refers to the capacity of the respiratory and cardiovascular systems to carry out continuous strenuous exercise. MS is the ability of the muscular system to produce force against a resistance in one maximal effort Gabbard (2012). Many researchers in the health field choose tests of explosive strength (e.g., horizontal, and vertical jumps), or power, to represent MS as a component of fitness. ME is the ability of the muscular system to produce force over a prolonged period. ME and MS together contribute to muscular fitness (MF), a term that refers to the ability to do work against a resistance either maximally, explosively, or repeatedly. Flexibility is the range of motion at a joint. Body composition is the physical make-up of the body, often described as the percentage of muscle, fat, bone, and water within the body. This definition of HRF, as a multidimensional construct consisting of five components, is widely accepted, and utilized within health promotion.

Summary-

Health-related components of Physical Fitness. There are five components of physical fitness: (1) body composition, (2) flexibility, (3) muscular strength, (4) muscular endurance, and (5) cardiorespiratory endurance. A well-balanced exercise program should include activities that address all the health-related components of

fitness. Aerobic activities develop cardiorespiratory endurance and burn calories to aid in achieving a healthy body composition. Muscle-strengthening activities develop muscular strength and endurance and assist with the development of a healthy body composition. Activities such as stretching, and yoga help improve flexibility.

Important of health-related fitness

Cardiovascular endurance, or cardio, is important for strengthening your heart and lungs, which help to deliver oxygen and nutrients throughout your body. Cardiovascular endurance is a measure of how well you can do exercises that involve your whole body at moderate to high intensity for an extended time. Improving your cardiovascular endurance can make it easier for you to carry out your daily tasks. It can also lessen your risk of diseases such as diabetes, heart disease, obesity, some types of cancer, high blood pressure and stroke. (WebMD Editorial Contributors, 2021).

Muscular strength and endurance are two important parts of your body's ability to move, lift things and do day-to-day activities. Muscular strength is the amount of force you can put out or the amount of weight you can lift. Muscular endurance is how many times you can move that weight without getting exhausted (very tired). Being physically strong helps you move and lift heavier objects with ease, which can make day-to-day tasks much easier. Muscular endurance is how love your muscles can endure and exercise. It's important for longer duration exercise as it allows you to withstand exercise for longer without getting fatigued. Muscular strength and endurance are important for many reasons, increase your ability to do activities like opening doors, lifting boxes or chopping wood without getting tired, Reduce the risk of injury, help you keep a healthy body weight, Lead to healthier, stronger muscles and bones, improve confidence and how you feel about yourself, give you a sense of accomplishment and Allow you to add new and different activities to your exercise program (Mayo Clinic Staff, 2022).

Regular stretching can help increase flexibility and may support your performance in sports that require flexibility. Being flexible may help you perform daily tasks easier and maintain better balance, though more research is needed.

There are so many benefits to stretching. It is an important part of living a long and healthy life. You may be wondering why flexibility is so important and such an essential part of your fitness routine. Read the top reasons why below. Decreases muscle stiffness and increases range of motion, may reduce your risk of injury, Helps relieve post-exercise aches and pains, improves posture, Helps reduce or manage stress. Well-stretched muscles hold less tension and, therefore, can help you feel less stressed, reduces muscular tension, enhances muscular relaxation, improves mechanical efficiency and overall functional performance. Because a flexible joint requires less energy to move through a wider range of motion, a flexible body improves overall performance by creating more energy-efficient movements, preparing the body for the stress of exercise. Stretching prior to exercise allows your muscles to loosen up and become better able to withstand the impact of the activity you choose to do, Promotes circulation. Stretching increases blood supply to your muscles and joints, which allows for greater nutrient transportation and improves the circulation of blood through your entire body and decreases the risk of low-back pain. Flexibility in the hamstrings, hip flexors and muscles attached to the pelvis relieves stress on the lumbar spine, which in turn reduces your risk of low-back pain. (LEANNA OLBINSKY, 2022).

Body composition plays an important role in understanding your health and wellness, measuring the differences between leanness and too much fat. This allows you to accurately assess your health and plan your lifestyle and diet accordingly. (Katey Davidson, MScFN, RD, CPT, 2022).

The measurement of health-related fitness

HRF was assessed by introducing students to a battery of physical fitness tests. The same team of investigators performed a set of physical fitness tests in a study sample. The physical fitness including push-up, sit up with extended legs for boys and bent-knees for girls to assess upper body muscular strength, seven stages sit-up test to gauge abdominal muscular strength and endurance, sit-and-reach test to assess low back flexibility, and step up and down to assess cardiorespiratory

fitness. Each session included a warm-up exercise (10 min), exercises related to four physical fitness elements (10 min each), and a cool-down exercise (5 min). Because students with poor physical fitness were enrolled, exercise intensity was initially low and proceeded according to their personal fitness level but gradually increased over the course of the 8-week program. (Kamil Aboshkair, M.Phil / PhD's, Saidon Amri, Lian-Yee Kok, Riyadh Khaleel Khammam's & Ali Yousuf Hussein's, 2012).

Meaning of overweight

Overweight and Obesity is defined as an abnormal or excessive fat accumulation that presents a risk to the health. The main cause of weight gain and obesity is the imbalance between the number of calories you take in and the calories you burn. (World Health Organization, 2021). Body mass index (BMI) is a simple index of weight-for-height that is commonly used in classifying overweight and obesity in adult populations and individuals. It is defined as the weight in kilograms divided by the square of the height in meters (kg/m2). BMI provides the most useful population-level measure of overweight and obesity as it is the same for both sexes and for all ages of adults. However, it should be considered as a rough guide because it may not correspond to the same degree of fatness in different individuals. (World health organization, 2006).

The WHO has defined obesity as a body mass index >30 kg/m2, as this is the point where the risk of several obesity-related diseases, including diabetes, start to rise exponentially. However, body mass index is not always the best indicator of adiposity, especially with respect to diabetes risk, as fat distribution is also important. Furthermore, especially in some populations, the risk of diabetes is significant even when body mass index is only slightly increased into the overweight category (BMI >25 kg/m2), especially when the excess fat is in the abdominal cavity.7 Hence a more practical definition is that obesity represents an accumulation of excess body fat that has a significant adverse effect on health. (John P.H. Wilding, 2001).

The etiology of overweight and obesity in children is because of the combination of several factors; among the factors that influence increased weight gain are genetic, metabolic, behavioral, environment, cultural, and socioeconomic.

And among these influences, behavioral and environmental factors have the most potential impact on the incidence of overweight and obesity. (Kelly and Patterson 2006).

Summary – overweight is a person who weighs more than the healthy range for their age, gender, and height. Obesity is a person who weighs much more than the healthy range for their age, gender, and height.

Body Mass Index (BMI)

Body mass index (BMI) refers to a measure of relative body weight that takes height into account and is correlated with direct measures of body fat. The body mass index (BMI) is the metric currently in use for defining anthropometric height/weight characteristics in adults and for classifying (categorizing) them into groups. The common interpretation is that it represents an index of an individual's fatness. It also is widely used as a risk factor for the development of or the prevalence of several health issues. In addition, it is widely used in determining public health policies. The BMI has been useful in population-based studies by virtue of its wide acceptance in defining specific categories of body mass as a health issue. However, it is increasingly clear that BMI is a rather poor indicator of percentage of body fat. Importantly, the BMI also does not capture information on the mass of fat in different body sites. The latter is related not only to untoward health issues but to social issues as well. Lastly, current evidence indicates there is a wide range of BMIs over which mortality risk is modest, and this is age related. (Frunk Nuttall, 2015).

It is one way of measuring whether a person's weight or body fat is higher than what is considered a healthy weight for a given height. This is measured by: calculating a person's weight in kilograms, then dividing that number by the person's height in meters squared (kg/m2). If the resulting ratio is high, then it can be an indicator of high body fat. BMI provides the most useful population-level measure of overweight and obesity as it is the same for both sexes and for all ages of adults. However, it should be considered as a rough guide because it may not correspond to the same degree of fatness in different individuals. The World Health Organization (WHO) defines "overweight" as a BMI equal to or more than 25, and "obesity" as a BMI

equal to or more than 30. (World Health Organization, 2006). The Asian (BMI) defines “overweigh” as a BMI equal to or more than 23 - 24.9, and “obesity” as a BMI equal to or more than 25 – 29.9. Weight that is higher than what is considered healthy for a given height is described as overweight or obese. Body Mass Index (BMI) is a screening tool for overweight and obesity. To calculate BMI, see the Adult BMI Calculator or determine BMI by finding your height and weight in this BMI Index Chart. Therefore, knowing one’s BMI is beneficial when trying to determine one’s risk of chronic disease. The researcher has a short

Nutritional status	Who Criteria BMI Cut-off	“Asian Criteria” BMI cut-off
Underweight	<18.5	<18.5
normal	18.5 – 24.9	18.5 – 22.9
overweight	25 – 29.5	23 – 24.9
Pre – obese	-	25 – 29.9
Obese	30	30
Obese type 1 (Obese)	30 - 40	30 - 40
Obese type 2 (morbid obese)	40.1 - 50	40.1 – 50
Obese type 3 (super obese	>50	>50

Table- overweight classification according to WHO and Asia- Pacific guidelines, In the study BMI use for Asian criterial (More than 23)

The table below is about Thoo Mweh Khee, Grade 12 students BMI with 20 students aged 18, 11 boys and 9 girls found that

Table 1

Students	Sex	high	Weigh	Age	BMI	Level
1	Female	165	64	18	23.5	Overweight
2	Female	162	64	18	24.4	Overweight
3	Female	152	55	18	23.8	Overweight
4	Female	151	53	18	23.2	Overweight
5	Female	150	54	18	24	Overweight
6	Female	153	57	18	24.3	Overweight
7	Female	153	57	18	24.4	Overweight
8	Female	161	60	18	23.1	Overweight
9	Female	151	56	18	24.56	Overweight
10	Male	158	62	18	24.8	Overweight
11	Male	167	65	18	23.3	Overweight
12	Male	170	70	18	24.2	Overweight
13	Male	165	65	18	23.9	Overweight
14	Male	150	56	18	24.9	Overweight
15	Male	165	67	18	24.6	Overweight
16	Male	174	71	18	23.5	Overweight
17	Male	163	62	18	23.3	Overweight
18	Male	142	50	18	24.8	Overweight
19	Male	175	71	18	23.2	Overweight
20	Male	167	65	18	23.3	Overweight

The students who are overweight 20

The Causes of overweight

The cause of obesity ensues when an individual's body accumulates abnormal amounts of fat. This takes place when energy intake exceeds energy expenditure over time. Many factors could contribute to the rising obesity epidemic. (Tahir Omer, 2020).

Studies of total energy intake in the population suggest that this has (in the UK) been declining since the 1980s, which is paradoxical, given that this is the period that has seen the most rapid and sustained increase in the prevalence of obesity. However, this does not include soft drinks, alcoholic beverages or food purchased and eaten outside the home. This type of food tends to be high in fat, and therefore tends to be energy dense. Experimental studies show that consumption of such food leads to less satiety than with less energy dense foods, and encourages overconsumption, suggesting that the peripheral and hypothalamic regulatory systems are less sensitive to a high fat diet. (John P.H. Wilding, 2001). Regularly eating high-calorie foods, such as fast foods, baked goods, and vending machine snacks, can cause your child to gain weight. Candy and desserts also can cause weight gain, and more and more evidence point to sugary drinks, including fruit juices and sports drinks, as culprits in obesity in some people. In communities and families where highly processed fast and convenient foods are dietary staples, it's easy to consume a lot of calories. These foods are high in sugar and fat and low in fiber and other nutrients, which can leave you hungrier. Their ingredients promote addictive eating patterns. In some communities, these may be the only types of foods readily available, due to both cost and access. The Centers for Disease Control estimate that 40% of households in America live more than a mile from healthy food retailers. The food industry is not designed to maintain our health. It's designed to sell products that we will become addicted to and want to buy more of. High on that list of products are sweets and sugary drinks, which have no nutritional value and a lot of added calories. But even standard foods have high levels of added sugar to make them more appealing and addictive. It's so common that it's changed our taste expectations. (Cleveland Clinic, 2022).

Levels of physical activity have declined dramatically in the last 30–50 years. There is greater reliance on the car, there are fewer manual occupations and there is increasing use of labor-saving devices. Leisure time physical activity has also declined, in parallel with increased use of television and computer games. The latter is a particular concern amongst children, where rates of obesity are rising in an alarming way. (John P.H. Wilding, 2001). Lack of exercise. Children who don't exercise much are more likely to gain weight because they don't burn as many calories. Too much time spent on sedentary activities, such as watching television or playing video games, also contributes to the problem. TV shows also often feature ads for unhealthy foods. Personal, parental, and family stress can increase a child's risk of obesity. Some children overeat to cope with problems or to deal with emotions, such as stress, or to fight boredom. Their parents might have similar tendencies. Socioeconomic factors. People in some communities have limited resources and limited access to supermarkets. As a result, they might buy convenience foods that don't spoil quickly, such as frozen meals, crackers, and cookies. Also, people who live in lower income neighborhoods might not have access to a safe place to exercise. (Mayo clinic staff, 2021).

Sedentary is someone who spends a lot of time sitting down, and not moving or exercising very much. The students who are living a sedentary lifestyle often sit or lie down. They don’t do a lot of activities. They spend several hours watching TV, playing video games, reading, or using a mobile phone or computer for much of the day. A sedentary lifestyle can contribute to obesity. Sedentary behavior refers to activities that use very little energy while being awake. Examples of sedentary behavior include sitting for long periods, watching television, riding in a bus or car, playing passive video games, playing on the computer, and sitting in a car seat or stroller. (KFA &A public helath, 2002)

Lack of sleep can result in hormonal imbalance (impaired glucose tolerance and increased nocturnal cortisol) and adversely affect the cognitive function leading to obesity. A prospective study recruited more than 100 patients from primary care in the USA to review the association between sleeping hours and BMI. There was a

linear relationship between lack of sleep and increased BMI. Among the strengths of this. study is the large heterogeneous groups of subjects from different sites. However, due to the observational nature of the study, confounding factors cannot be ruled out. (Tahir Omer, 2020).

Obesity has various causes, and it is a multi-factorial condition determined by genetic, behavioral, environmental, and cultural factors. Genetic variations play an important role in individual predisposition, but other determinants like behaviour and environment may also have crucial impact on childhood obesity. (Agnieszka Danuta Maslak, Paulina Pawluczuk, Pawel Polski, Monika kusz & Adam Alzubed, 2020).

Genetic factors play a role in pathogenesis of obesity in about 40-70%. In some cases, genetic variations completely determine obesity development, in other it is a close interaction between genes and the environment. It was found that the risk of developing overweight or obesity is 4-5 times higher when one parent is obese. However, this probability increases 13 times when both parents are obese. For 3 years old child parental obesity is a stronger predictor of obesity in adulthood than the weight status of this infant. There are lots of genes responsible for insulin sensitivity, activity of enzymes regulating lipids metabolism and its oxidation. Genes also have an impact on taste preferences and body weight stability. It could be a single gene defect e.g. abnormalities in leptin signaling pathway or melanocortin-4 receptor defect. Obesity can also be a manifestation of some genetic syndromes including Prader-Willi syndrome, Bardet-Biedl syndrome, Alstom syndrome, WAGR syndrome and Cohen syndrome. Knowledge of genetic aspects of obesity is important to understand some difficulties in losing weight among children from families prone to accumulate fat in response to the positive energy balance (Agnieszka Danuta Maslak, Paulina Pawluczuk, Pawel Polski, Monika kusz & Adam Alzubed, 2020).

Energy metabolism and appetite regulation depend on complex neuroendocrine interactions, which control food intake and energy use. Interactions between orexigenic (appetite-stimulating) and anorexigenic (reducing appetite and food intake) factors influence energy balance, which result in body weight gain or loss. The most important hormones that affect appetite regulation are leptin,

ghrelin, and insulin. Leptin is a protein produced by matured adipocytes and acts in the hypothalamus where inhibits neuropeptide Y synthesis. Leptin is a major anorexigenic hormone and its concentration depends on adipose tissue amount. Fasting and weight loss decrease plasma concentration of leptin and insulin, which increase food intake and lower energy expenditure by increasing neuropeptide Y synthesis, and probably by inhibiting catabolism. Conversely, high leptin and insulin concentration throughout eating and weight gain decrease food consumption and increase energy use by releasing melanocortin and corticotropin-releasing hormones. Other anorexigenic hormones, which are secreted by the gastrointestinal tract, include: peptide tyrosine tyrosine (PYY), pancreatic polypeptide, oxyntomodulin, amylin, glucagon, glucagon-like peptide-1 (GLP-1) and GLP-2. The major orexigenic peptides are orexins A and B- secreted by the hypothalamus, and ghrelin- secreted by the stomach. Ghrelin increases appetite through activation of the neuropeptide Y receptors. (Agnieszka Danuta Maslak, Paulina Pawluczuk, Pawel Polski, Monika kusz & Adam Alzubed, 2020).

Parent's habits have a great impact on a child's eating behaviors and physical activity, especially among those in age of 5 to 11. After this period parental influence may be small because of the increasing impact of peers' preferences. However, children's eating habits develop early in life so parental behaviors modify a child's food choices. Parenting style, which provides family principles and routines may influence children's behaviors. For instance, family meals reduce time spending in front of TV screen and enhance quality of the diet, parents' support and partnership in physical activity causes greater physical activity in children, while settling limits of TV watching decrease the screen time. They are also responsible for availability and variety of food. There is a positive connection between enough fruits and vegetables at home and it's consumption by kids. Parental factors, especially maternal ones, have an impact on child's overweight as soon as in prenatal stages. Prenatal factors which are positively linked to obesity in early childhood include maternal obesity before pregnancy, maternal nutrition, high weight gain (more than 20 kg) and smoking during pregnancy, maternal depression in the prenatal stage and gestational diabetes mellitus. A mother's obesity early in the pregnancy almost twice

increase prediction of development overweight or obesity in 4-5 years old children. On the other hand, malnutrition of pregnant woman, especially deficiency in protein, iron and zinc intake can lead to dysfunction of placenta which may cause overweight or obesity later in children's life. Breastfeeding has a protective effect on a child's weight, especially when it lasts more than 16 months. Breastfeeding is also correlated with healthier feeding practice in childhood e.g. lower consumption of ultra-processed food and sweetened beverages. Instead, overfeeding even in the first day of life has a positive impact on the development of overweight and obesity as well as introducing solid foods before 4 months after birth which may result in greater consumption of meals reach in fat and sugar. In addition, Rocha et al. study shows that girls of mother who felt safe in a household presented less risk of development overweight in about 40%. Socio-economic status also has an effect in the development of healthy feeding practices. Some studies show the negative correlation between socio-economic status of developed 15 countries and prevalence of overweight and obesity. The opposite effect is observed in developing countries where higher socio-economic status is related with greater risk of excess body weight. Families with low socio-economic status present unhealthy behavior, bad choices regarding food, shopping, cooking, and exercising which provide to develop of obesity. The significant reason of increased BMI in children is also parents' economic status. In Okoro et al. study there was positive relation between family income and infant's obesity/overweight. Also, children from larger families were more likely to become obese. The study carried out by Yusuf et al. shows that children who were overweight or obese were usually a Hispanic or non-Hispanic Black, live with a single parent, came from poorer household, and have a parent with lower education level. Children from blended/adoptive families have poorer general health results and increased prevalence of body mass abnormalities. Kids with two-parent migration background have greater risk of becoming overweight or obese compared to non-migrants. Some ethnic minorities and indigenous people (e.g., Native Americans) are more likely to develop the overweight or obesity. Cultural factors affect it too. In Korea, for example excessive weight gain during pregnancy reflects mothers' health and fetal well-being. Overweight children are perceived as

healthy and well developed so they are frequently overfed. Parental depression which relates to unsupportive parenting and punitive approach regarding to kids may rise the risk of obesity development. Also, serious life events during childhood, as well as children depression and neglect, have a negative impact on child's weight status (Agnieszka Danuta Maslak, Paulina Pawluczuk, Pawel Polski, Monika kusz & Adam Alzubed, 2020).

Summary- Obesity is a multifactorial condition and inflicts serious health consequences, physical and mental alike. It is important to know the reasons for that problem and implement the adequate strategies at the right time. This responsibility rests both on families and society.

The impact of overweight and obesity

This increase in body mass presents public health challenges because of the attractive physical appearance of thin bodies, and poor health outcomes of overweight and obesity. The health condition of obese persons' is most often worse than people with normal weight. ((Shirin Djalalinia, Mostafa Qorbani, Niloofar Peykari and Roya kelishadi, 2015).

Physical health impact on overweight

Some of the co-morbidities related to overweight and obesity include cancers (cancers of breast, endometrial, ovarian, colorectal, esophageal, kidney, pancreatic, prostate), Type 2 diabetes, hypertension, stroke, Coronary Artery Disease, Congestive Heart Failure, asthma, chronic back pain, osteoarthritis, pulmonary embolism, gallbladder disease, and an increased risk of disability. All this leads to more than three million deaths worldwide annually. Overweight and obesity also carry a considerable health burden and will have a significant impact on health expenditures. Obesity has a strong association with the occurrence of chronic medical problems, impairment of health-related quality of life, and increasing the health care and medication spending, the related health care costs for obesity-related problems, for both individuals and health care systems, are substantial. (Shirin Djalalinia, Mostafa Qorbani, Niloofar Peykari and Roya kelishadi, 2015).

Overweight Impact on Mental health

The relationship between obesity and mental health disorders is not clear. However, overweight is a stigma, and obesity discrimination can lead to some mental disorders. Scientific evidence emphasizes on an increasing risk of low self-esteem, mood disorder, motivational disorders, eating problems, impaired body image, interpersonal communication problems and all these directly or indirectly affect the quality of life. On the other hand, in some cases, experiencing obesity discrimination has led to the development of psychopathology and poor health behavior that through a vicious cycle, will enhance their overeating, bulimia, or other related problems. Some studies have revealed that obesity in both men and women increase the risk of poorer sexual health. Obese individuals attribute this to their appearance and their weight and encounter frequent difficulties in their sexual activities. Sexual activity and sexual health outcomes such as sexual satisfaction, unintended pregnancy, and abortion have been mentioned as relevant issues. Sexual quality of life is particularly impaired for obese women who are also faced with complexity of the therapeutic procedures. As such we need to emphasize on more comprehensive population-based studies to find out the impact of overweight and obesity on different aspects of mental health including mood disorders, communication problems, self-satisfaction, and its effects on sexual health besides different aspects of quality of life. (Shirin Djalalinia, Mostafa Qorbani, Niloofar Peykari and Roya kelishadi, 2015).

Impact on social aspects

Consequences of obesity-related physical co-morbidity includes psychological impairments and stigmatization experienced by obese patients. The overweight stigma and attributable discrimination are documented in all the key areas of living, including growth and development, educational process, employment structure, and provision of health care. Obese individuals are most often ridiculed by their teachers, physicians, and public. At times they also suffer from discrimination, ridicule, social bias, rejection, and humiliation. Even specific obesity diagnostic or

therapeutic procedure such as related anthropometric assessments could potentially affect their care givers professional attitude and subsequent clinical evaluation and service provision for obese persons when they are seeking care. Weight-related discrimination, by itself is related to poor health behavior such as pathological overeating, binge eating or even sedentary life and decreased physical activity that in turn leads to greater weight gain. This vicious cycle again strengthens the risk of exposure to weight-related discrimination. (Shirin Djalalinia, Mostafa Qorbani, Niloofar Peykari and Roya kelishadi, 2015).

Overweight and obesity during childhood and adolescence have negative impacts on both physical and psychological well-being. From a physical point of view, obesity is associated with a higher risk for the development of insulin resistance, type 2 diabetes mellitus, and several cardiovascular abnormalities during childhood and adolescence. Although the end points for cardiovascular risks are not necessarily seen in childhood or adolescence, most of the major risk factors are, including high systolic and diastolic blood pressure, dyslipidemia (increased low-density lipoprotein cholesterol, raised triglycerides and low levels of high-density lipoprotein cholesterol), abnormal vascular endothelial function, abnormal left ventricular function, abnormalities in left ventricular mass and atherosclerotic lesions. While most cases of childhood diabetes mellitus were type 1, there has, over the last couple of decades, been a rapid increase in the development of obesity-associated type 2 diabetes mellitus. Symptoms of insulin resistance syndrome, including hyperinsulinemia, dyslipidemia, and hypertension, are not uncommon in obese children. Other conditions found in association with overweight and obesity in childhood and adolescence include the risk of developing asthma, or an increase in the severity of existing asthma, low-grade systemic inflammation, obstructive sleep apnea, early onset of puberty, foot and other skeletal abnormalities, and fatty liver disease. Overweight and obesity during childhood and adolescence not only influence well-being during this period but can persist into adulthood. Excess body fat in children and adolescents increases the risk for the development of several medical conditions during adulthood, including insulin resistance, adult-onset type 2 diabetes mellitus and cardiovascular problems such as hypertension, ischemic heart

disease and stroke. Overweight and obesity are also said to increase the risk for different cancers, skeletal problems, non-alcoholic fatty liver disease, polycystic ovarian syndrome, and a variety of inflammatory conditions. A recent systematic review of the literature showed that overweight and obesity in childhood and adolescence increase adulthood risk for disability pension, premature mortality and morbidity.

From a psychological point of view, low self-esteem seems to be the overriding concern of overweight and obesity during childhood and adolescence. Overweight and obesity during childhood and adolescence can give rise to a lack of confidence, negative self-perception, and depression. From a psychosocial perspective, stereotyping, discrimination, and social rejection may occur. These, in turn, may lead to withdrawal from physical activities with further aggravation of the weight problem. In a local study on urban school children living in Potchefstroom (South Africa), it was shown that overweight and obesity can significantly influence scholastic and athletic competency, physical self-concept, and social acceptance. As with the physical effects of overweight and obesity, the psychological impact may extend into adulthood. (Catharina Cornelia Grant & Catharina Cornelia Grant, 2021).

Health Consequences of overweight and obesity.

Obesity is defined as one of the severe, chronic diseases which leads to a huge number of health conditions and serious complications. A person is diagnosed to be overweight if their body contains a higher degree of fat than a normal person does. According to much recent research, the number of obese people all over the world has reached its highest peak in the last twenty-five years. Not only does obesity negatively affect people's health but is also directly places rising demand on health care services, as well as some economic problems. Having a risk factor like obesity doesn't mean that you'll develop the following health problems. But it does increase your chances of developing one or more of them. Here are 8 health risks of obesity:

Type 2 diabetes occurs when your blood sugar is higher than normal. Over time, this can lead to other health issues, like heart disease, nerve damage, stroke, kidney disease, and vision problems.

Heart disease is more prevalent in people with obesity. Over time, fatty deposits may accumulate in the arteries that supply the heart with blood. People with obesity have higher than normal blood pressure, low-density lipoprotein (LDL) cholesterol, triglycerides, and blood sugar, all of which contribute to heart disease.

Stroke and heart disease share many of the same risk factors. Strokes occur when the blood supply to the brain is cut off. A stroke can cause damage to brain tissue and result in a range of disabilities, including speech and language impairment, weakened muscles, and changes to thinking and reasoning skills.

Sleep apnea is a disorder in which someone may momentarily stop breathing during sleep. People who are overweight and living with obesity are at a higher risk of having sleep apnea. This is because they tend to have more fat stored around the neck, making the airway shrink. A smaller airway can cause snoring and difficulty breathing at night.

High blood pressure extra fat tissue in the body requires more oxygen and nutrients. Your blood vessels will need to circulate more blood to the extra fat tissue. This means your heart must work even harder to pump blood around the body. The increase in the amount of blood circulating puts extra pressure on the walls of your arteries. This added pressure is called high blood pressure, or hypertension. Over time, high blood pressure can damage your heart and arteries.

Liver disease. People with obesity can develop a liver disease known as fatty liver disease or nonalcoholic steatohepatitis (NASH). This happens when excess fat builds up in the liver. The excess fat can damage the liver or cause scar tissue to grow, known as cirrhosis. Fatty liver disease usually has no symptoms, but it can eventually lead to liver failure. The only way to reverse or manage the disease is to lose weight, exercise, and avoid drinking alcohol.

Gallbladder disease. The gallbladder is responsible for storing a substance known as bile and passing it to the small intestine during digestion. Bile helps you digest fat. Obesity increases your risk of developing gallstones. Gallstones occur when

bile builds up and hardens in the gallbladder. People with obesity may have higher levels of cholesterol in their bile, or have large gallbladders that don't work well, which can lead to gallstones. Gallstones can be painful and require surgery. Eating a diet high in fiber and healthy fats may help prevent gallstones. Avoiding refined grains like white rice, bread, and pasta can also help.

Certain cancers. Because cancer isn't a single disease, the association between obesity and cancer isn't as clear as other diseases like heart disease and stroke. Still, obesity can increase your risk for certain cancers, including breast, colon, gallbladder, pancreatic, kidney, and prostate cancer, as well as cancer of the uterus, cervix, endometrium, and ovaries. (Jacquelyn Cafasso, July 29, 2020).

Lawrence (2010), Judge and Jahns (2017) and Cornette (2008) share related opinions on the psychological effects of overweight and obesity on children. They say that overweight and obese children suffer problems of depression, low self-esteem, and poor academic performance. Judge and Jahns (2007) further explained that overweight girls exhibit undesirable internal behaviors such as loneliness, nervousness and sadness which makes them act out behaviors such as arguing and fighting. Depressive symptoms due to weight concerns, stigmatization from both peers and teachers further leads to poor performance.

Summary – Health consequences of overweight and obesity are Type 2 diabetes, Certain cancers, Gallbladder disease, Liver disease, High blood pressure, Sleep apnea, Stroke and Heart disease. Overweight and obese children suffer problems of depression, low self-esteem, and poor academic performance.

Factor Contribution to the development of overweight

A public health approach to develop population – based strategies for the prevention of excess weight gain is of great importance and has been advocated in recent years. The development and implementation of obesity prevention strategies should target factors contributing to obesity, should target barriers to lifestyle change at personal, environmental, and socioeconomic levels, and actively involve different levels of stakeholders and other major parties. A proposed framework by Sacks (2009) suggests that policy actions to the development and implementation of

effective public health strategies to obesity prevention should (1) target the food environments, the physical activity environments and the broader socioeconomic environments; (2) directly influence behavior, aiming at improving eating and physical activity behaviors; and (3) support health services and clinical interventions. Examples of policies under each of these groups are reviewed in the following sections. (Ruth Chan & Jean Woo, 2010).

Food, Physical Activity, and Socioeconomic Environments

To alter the food environment such that healthy choices are the easier and to alter the physical activity environment to facilitate higher levels of physical activities and to reduce sedentary lifestyle, are the key targets of obesity prevention policies. There are a wide range of policy areas that could influence the food environment. These areas include fiscal food policies, mandatory nutrition panels on the formulation and reformulation of manufactured foods, implementation of food and nutrition labeling, and restricting marketing and advertising bans of unhealthy foods. For instance, some studies have demonstrated that food prices have a marked influence on food-buying behavior. A small study was done in a cafeteria setting and was designed to look at the effects of availability and price on the consumption of fruit and salad. It was shown that increasing variety and reducing price by half roughly tripled consumption of both food items, whereas returning price and availability to the original environmental conditions brought consumption back to its original levels. A larger study designed to look at the effects of health education and pricing on the consumption of vending machine snacks also showed similar results, in which price reductions on low-fat items increased the proportional purchase of low-fat items by 9%, 39%, and 93% in the 10%, 25%, and 50% price reduction conditions, respectively. (Ruth Chan & Jean Woo, 2010).

Policy areas influencing physical activity environments include urban planning policies, transport policies and organizational policies on the provision of facilities for physical activity. A recent review by Sallis and Glanz (2009) summarized the impact of physical activity and food environments as solutions to the obesity epidemic. Living in walkable communities and having parks and other recreation

facilities nearby were consistently associated with higher levels of physical activity in youth, adults, and older adults. Better school design, such as including basketball hoops and having a large school ground, and better building design, such as signs promoting stair use and more convenient access to stairs than to elevators were associated with higher levels of physical activity in youth, adults, and older adults. As mentioned earlier, social inequality because of economic insecurity and a failing economic environment is also considered as one of the probable causes of obesity. Therefore, policy areas covering finance, education, employment and social policies could impact population health. As illustrated by Sacks (2009), trade agreements between countries, personal income tax regimes and social security mechanisms are some potential policy areas that could be altered at international, national, and state levels for the development of population-based strategies for obesity prevention. (Ruth Chan & Jean Woo, 2010).

Influencing Eating and Physical Activity Behaviors

According to Sacks' framework (2009), policies that directly influence behaviors need to have According to Sacks' framework (2009), policies that directly influence behaviors need to have a direct effect in the settings in which people live their lives. There are many key settings, such as schools, home environment, workplaces, and community, in which policies could target to directly influence the eating and physical activity behaviors. A policy-based school intervention has been found to be effective for the prevention and control of obesity. The two-year school Nutrition Policy Initiative including components of school self-assessment, nutrition education, nutrition policy, social marketing, and parent outreach has been documented to be effective in reducing the incidence of overweight in school children. A review examined the effectiveness of school-based strategies for obesity prevention and control based on results of nineteen included studies. Parental or family involvement of nutrition and physical activity interventions also induced weight reduction. A study has evaluated the effectiveness of an intervention program, based on the Theory of Planned Behavior, on obesity indices and blood pressure in Ioannina, Greece. In this study, 321 fifth grade students were assigned to

the one-year school-based intervention focused on overcoming the barriers in accessing physical activity areas, increasing the availability of fruits and vegetables, and increasing parental support, and 325 students served as control group. After the one-year follow up, a significantly higher consumption of fruits and lower consumption of fats/oils and sweets/beverages was observed in the intervention group compared with the control group. The intervention group also showed significantly lower BMI and blood pressure than the control group. The leadership role for schools in promoting physical activity in children and youth has also been advocated in a Scientific Statement from the American Heart Association Council. The Statement points out that schools are potentially attractive settings in which to promote positive health behaviors because students spend large amounts of time in the school environment, elements of the traditional school curriculum relate directly to health, and schools typically provide extracurricular programs that can promote health. The home environment is undoubtedly an important setting in preventing overweight and obesity. Television viewing has been identified as an independent risk factor for obesity. Potential strategies to reduce television time include messages to parents about not having a television in activity environment include purchasing healthy foods, practicing regular mealtimes, allocating individual portions, creating opportunities for physical activities, and the parents as role models for healthy eating. Other potential settings for interventions include restaurants, cafeterias and other food-service settings, supermarkets, and workplaces. The constructs of interest include the availability and price of healthy food choices, quality of food, portion sizes, within-outlet promotions, and point-of-choice nutrition information. children's bedrooms, encouraging family rules restricting television viewing, and not having the television on during dinner. Other potential areas to target in terms of the home food and physical.

Supporting Health Services and Clinical Interventions

A number of barriers to an effective obesity management program have been identified at the physician practice level, a lack of time to address obesity during routine office visits, a lack of reimbursement, inadequate training and low self-

efficacy in handling patients of excess weight are some barriers to an effective management. At the patient level, stigmatization, a lack of financial incentive, difficulties in accessing weight management services are identified as barriers to effective management. There are several potential policy areas in which the involvement of primary care in reducing overweight and obesity could be increased. These areas include increasing the number of dietitians and nutritionists in hospitals and subsidization of weight-loss medication, providing professional and organizational support and training, and by offering financial incentives. A systematic professionals' management of obesity or the organization of care for overweight and obese people. (Ruth Chan & Jean Woo, 2010).

A report by the World Health Organization (WHO) has stated that there is convincing evidence that eating fruits and vegetables decreases the risk of obesity. Compared to high-calorie foods such as processed foods high in sugar and fat, fruits and vegetables are less likely to contribute to obesity or overweight. And, because they contain higher amounts of dietary fiber and other nutrients, they are associated with a lower risk for diabetes and resistance. For the same reasons, they also make people feel full of fewer calories, thus helping to prevent weight gain. Additionally, research has shown that eating three to five servings of fruits and vegetables per day can decrease your risk of stroke, and eating more than five servings per day may decrease that risk even more. In an incremental fashion, the more fruits, and vegetables you eat, the lower your risk. A very good return on your investment. (Yasmine S. Ali, MD, MSCL on September 17, 2022).

The International Agency for Research on Cancer (IARC), a part of the WHO, has published a report on cancer-causing processed meats, stating that such meats can cause colorectal cancer. They have also stated that red meat in general "probably" causes cancers such as colon, pancreatic, and prostate cancer. Given that obesity is a risk factor for several different cancers, it is helpful to do all you can to decrease your risk. Examples of processed meats to avoid hot dogs, sausage, beef jerky, bacon, corned beef, ham, packaged deli meats, canned meat, and canned meat-based preparations and sauces. (Yasmine S. Ali, MD, MSCL, 2022).

The many health benefits of drinking water are often overlooked. But don't underestimate the importance of what may be the healthiest beverage of all. Water has no calories. Zero. What it does have plenty of: health benefits. Researchers have found that drinking a glass of water 30 minutes before you have a meal can make you feel fuller and thus more likely to eat less, thereby reducing calorie intake. Staying hydrated throughout the day can make you more alert, help you think more clearly, and make you feel less fatigued. All of that can lead to making better dietary choices as well. As an added bonus, drinking enough water throughout the day can help in the prevention of recurrent kidney stones and can also prevent constipation. (Yasmine S. Ali, MD, MSCL on September 17, 2022).

Aerobic exercise involves physical activity that increases your breathing and heart rate to fuel your body with oxygen-rich blood. Aerobic exercise helps strengthen your heart muscle, improves your lung function, and increases circulation and healthy blood flow throughout your body. Aerobic means “with oxygen,” so aerobic exercise is any physical activity that involves increased amounts of oxygen throughout your body. As you exercise, your muscles require increased oxygen to contract for a prolonged period. With aerobic exercise, cells undergo cellular respiration, in which oxygen and other molecules are converted into adenosine triphosphate. The primary energy source for cells. Your heart rate will increase to pump more oxygen-carrying blood throughout the body to supply more oxygen to your muscles. Your breathing rate will also increase to bring more oxygen into the body and the bloodstream. Because aerobic exercise requires increased functioning of your heart and lungs or cardiovascular system, aerobic exercise is often called cardiovascular exercise, or “cardio.” Cardio, or aerobic exercise, is extremely beneficial for maintaining the healthy functioning of your entire body. Regular cardiovascular exercise can: Improve heart function and lower resting heart rate, Improve lung function, Improve oxygen supply throughout the body, Improve circulation, decrease high blood pressure .Decrease inflammation throughout the body, Improve mood and energy, Decrease risk of developing conditions like diabetes, heart disease, and stroke, Lower your blood sugar, Lower high cholesterol and triglycerides and Increase weight loss. Aerobic exercises are generally any

exercises that get your body moving for a prolonged period of time, such as: Walking, Jogging, Running, Hiking, Bicycling, Swimming, jumping rope, Dancing, Stair climbing, Rowing and Playing sports. (Kristen Gasnick, PT, DPF, on May 9, 2022).

The etiology of obesity is multifactorial, involving complex interactions among the genetic background, hormones, and different social and environmental factors, such as sedentary lifestyle and unhealthy dietary habits. Nutrition transition because of urbanization and affluence has been considered as the major cause for the obesity epidemic. Numerous literatures have documented a marked shift in the dietary pattern worldwide. Major dietary changes include a higher energy density diet with a greater role for fat and added sugars in foods, greater saturated fat intake (mostly from animal sources), marked increases in animal food consumption, reduced intakes of complex carbohydrates and dietary fiber, and reduced fruit and vegetable intake. These dietary changes are compounded by lifestyle changes that reflect reduced physical activity at work and during leisure time. Several studies have shown that insufficient physical activity is one of the important risk factors of obesity, and work-related activity has declined over recent decades in industrialized countries whereas leisure time dominated by television viewing and other physically inactive pastimes has increased.

Social inequality because of economic insecurity and a failing economic environment is also considered as one of the probable causes of obesity. A review by Drewnowski, (2009) indicates that inequitable access to healthy foods as determined by socioeconomic factors could influence the diet and health of a population. Energy-dense and nutrient-poor foods become the best way to provide daily calories at an affordable cost by the poor groups, whereas nutrient-rich foods and high-quality diets not only cost more but are consumed by more affluent groups. Lack of accessibility of healthy food choices and the commercial driven food market environment are also considered as other probable causes of obesity.

The interaction effects among environmental factors, genetic predisposition and individual behavior on excess weight gain has received research interests in recent decades. “Gene-environment interaction” refers to a situation in which the response or the adaptation to an environmental agent, a behavior, or a change in

behavior is conditional on the genotype of the individual. Observational evidence has shown that susceptibility to obesity is determined largely by genetic factors, but the environment prompts phenotype expression.

An adverse environment during in utero or postnatal periods has also been suggested as one possible cause for the development of obesity, indicating that the mother's nutrition or perinatal lifestyle could affect the developmental programming of the fetus. The concept of programming in fetal or postnatal life is firstly established from experimental animal studies. A wealth of evidence from animal studies has demonstrated that exposure to an elevated or excess nutrient supply before birth is associated with an increased risk of obesity and associated metabolic disorders in later life. Results from epidemiological studies and experimental studies in humans also supported that intrauterine or postnatal nutrition could predispose individuals to obesity in later life. In a review by Martorell and colleagues (2001), intrauterine over-nutrition as proxied by high birth weight or gestational diabetes is associated with subsequent fatness, and breastfeeding has a protective effect on the development of obesity. In contrast, the evidence that poor nutrition in early life is a risk factor for increased fatness later in life is still inconclusive. (Ruth Chan & Jean Woo, 2010)

The FITT Principle

A well-designed personal physical activity plan will outline how often (frequency), how long (time), and how hard (intensity) a person exercises, and what kinds of exercises (type) are selected. The exercise frequency, intensity, time, and type (FITT principle) are key components of any fitness plan or routine.

Frequency

This refers to how often you train. The first thing to set up with your workout plan is frequency—how often you will exercise. Frequency often depends on various factors, including the type of workout you're doing, how hard you're working, your fitness level, and your exercise goals. For the general population, UK guidelines recommend strength training on at least two days a week and at least 150 minutes of moderate-intensity or 75 minutes of vigorous-intensity exercise spread

across the week. For adults aged 65+, they should also engage in balancing activities twice per week to reduce the chance of frailty and falls. ((Emily Dingley, 2021).

Intensity

This refers to how hard you work during a training session. The intensity of your training will also differ depending on the type of training you're doing and your goal. In strength training, we can manipulate a number of variables (load lifted, recovery time and the number of repetitions and sets) to alter the intensity of the exercise. The intensity and therefore how you manipulate these variables are dependent upon your goal. Below are some general guidelines on how you can manipulate these variables to meet your goal. (Emily Dingley, 2021).

Time

Time refers to the duration of the training session. UK guidelines recommend 150 minutes of moderate-intensity or 75 minutes of vigorous-intensity exercise spread across the week for the general population – how you split this time up into each session is up to you. If you're a beginner, you may want to start off with shorter sessions until your body has gotten used to training and then alter the amount of time, you're training to depend on your goal. Anywhere from 30 to 60 minutes or more (Emily Dingley, 2021).

Type

The type of exercise you choose will have a big effect on the results you achieve. That's why it's important to know what you want to gain from your efforts. For example, if you're looking to improve your cardio-vascular fitness, then exercises like walking, jogging, swimming, bike riding, stair climbing, aerobics and rowing are very effective. For weight loss, any exercise that uses most of your large muscle groups will be effective. To improve muscular strength the best exercises, include the use of free weights, machine weights and body weight exercises like push-ups, chin-ups and dips. Any exercise you can do continually, like running, walking, cycling, swimming, rowing, stair-climber, elliptical trainer, etc. (Brad Walker, 2019).

An individual's goals, present fitness level, age, health, skills, interest, and availability of time are among the factors to consider in developing a personal physical activity plan. Every plan should have a schedule that progresses over time. Progression can take the form of changes in any of the FITT components, but not all at once. For example, an athlete training for high-level competition would follow a different program than would a person whose goals are to develop good health from a sedentary start. Regardless of the specific goals, both programs would be based upon the elements of the FITT principle. Initially, a personal physical activity plan does not need to include all the health-related fitness components. The choice of which components to focus on initially should be based upon the likelihood of adopting the new behavior and a consideration of whether the goals are SMART (specific, measurable, attainable, realistic, and time framed—see Module B, Lesson 5). Over the course of weeks or months, other components would be added. A common progression is to adopt a CRE program (three times a week, 20 minutes per session, moderate intensity) without specific muscular strength or muscular endurance elements. After each CRE session the cool down would simply entail a few stretches for flexibility. After a few weeks of successful completion of the program, a new element could be added. (Emily Dingley, 2021).

Applying the FITT Principle

According to the FITT principle, an exercise routine should include exercises and activities that will improve the health-related fitness components:

1. cardiorespiratory endurance
2. muscular strength
3. muscular endurance
4. flexibility
5. Body composition

Each workout or exercise session should begin with a warm-up and end with a cool-down. Generally, rest and recovery are as important to plan as physical activity and exercise and should be equally spaced between workouts. The more intense the exercise is, the longer the time required to recover. Likewise, the more

novel the exercise is, the longer the time required to recover. Trying to adopt all aspects of health-related fitness at once may not be realistic. Begin with small realistic goals in one or two areas of health-related fitness and plan to introduce more as time progresses and new behaviors become habits. The following guidelines are provided to identify the amount of activity or exercise necessary for the average healthy person to attain and/or maintain a minimum level of overall fitness. Included are examples of activities/exercises, as well as safety considerations for each health-related fitness component.

Warm-up: Warm-up activities are crucial parts of any exercise routine or sports training to prepare the body and mind for movement. The importance of a structured warm-up routine should not be underestimated in relation to preventing injury, having optimal performance, and maximizing enjoyment. An effective warm-up increases both the respiratory rate and the heart rate. This helps increase the body's core temperature while also increasing the body's muscle temperature through an increase in the delivery of oxygen and nutrients to the working muscles. Increasing muscle temperature helps make the muscles loose, supple, and pliable. Another reason why warm-up activities are important is that they provide the participant with an opportunity to prepare mentally for the upcoming exercise session. A warm-up should consist of light physical activity for 5 to 10 minutes of exercise, such as walking, slow jogging, knee lifts, arm circles, or trunk rotations. Low-intensity movements that simulate movements to be used in the activity can also be included in the warm-up. Static stretching, per se, is not considered part of a warm-up routine. A warm-up can consist of a lower intensity form of the exercise about to commence.

Cardiorespiratory endurance (CRE): At least three 20- to 30-minute bouts of aerobic (activity requiring oxygen) exercise each week are recommended. Popular aerobic conditioning activities include walking, running beep test and jogging cross-country skiing, and some continuous action games such as basketball and soccer. The type of activity suitable for a person to develop cardiorespiratory fitness is dependent upon the person's initial fitness. A jog may be intense for one individual and serve as a warm-up for another.

Muscular strength: two or three 20-minute sessions each week that include exercises for all the major muscle groups are required. Lifting weights is one of the most effective ways to increase strength. For sedentary people, as little as two workouts per week can be beneficial.

Muscular endurance: Two to three 30-minute sessions each week that include exercises such as calisthenics, push-ups, curl-ups, pull-ups, and light weight training for all the major muscle groups are required. For a sedentary person, muscular strength and muscular endurance sessions can be combined and limited to two sessions per week. Then, as the behavior is adopted (becomes a habit), additional sessions per week can be added.

Flexibility: At the end of every workout, perform 5 to 10 minutes of static stretching exercises. If a workout session includes a CRE session and a resistance training session, flexibility is best left to the end of the entire exercise routine.

Charter 3

Research design and methodology

Research Design and methodology

In this study examining the effects of health-related fitness and wellness training on overweight awareness and physical activity levels, the participants were administered pre-tests and post-tests. Design included a randomized controlled experimental group.

Pre - test	Treatment	Post-Test
O1	*X*	*O2*

Population

The population in this study were students in Grade 12 at Thoo Mweh Khee Migrant Learning Center. The total number of the Grade 12 students was 226. The study participants were recruited from Thoo Mweh khee Migrant Learning Center during the 2022-2023 academic year and consisted of (114) female and (112) male students.

Sample

In the study the criteria used for participation was a BMI more than 23 and students from 18 years of age. The breakdown of participants tested was.

1. underweight (32)
2. healthy weight (165),
3. overweight (20) and
4. obese (9).

As a result, the sample of the study were the 20 students under number 3 above, studying at Thoo Mweh Khee Migrant Learning Center.

Variables in the Research

Independent Variable – Thoo Mweh Khee exercise program

Dependent variable – health related fitness

Research Instruments and Instrument Development

BMI and Health Related Fitness Program

Body Mass Index Body mass index (BMI) is a universally used unit of measurement expressed as kg/m2. It is therefore calculated by dividing an individual's mass in kilograms by the square of their height in meters. The World Health Organization (WHO) has provided the following values most used to help determine an individual's weight status according to BMI:

1. underweight individuals score below 18.5.
2. those classed as having normal weight score between 18.5 -24.9
3. overweight individuals receive scores between 25.0 - 29.9
4. individuals classed as obese could score anything over 30.0 – 34.9

For Asian BMI.

1. underweight score 18.5.
2. normal weight score between 18.5 -22.9.
3. overweight scores between 23-24.9 and
4. obesity score anything over 25-29.5.

Students who could be classified as being of normal weight, overweight, or obese were selected as participants for this study. Physical fitness test: A battery of simple field tests were used. In addition to BMI there were five fitness assessments, including: sit-ups (30 seconds), push-ups (30 seconds), sit-and reach, (60 seconds) step-ups (3 minutes). Sit-and-reach was recorded twice, and the better reach (cm.) was used.

Data Collection

During visit one, participants will sign informed consent forms (fitness assessment form) and have any questions answered before continuing. They will then be put through a screening process beginning with physical examination. Prior to

the start of the study, the height and bodyweight of Grade 12, (226) students were measured, and body mass index (BMI) was determined by inserting these numbers in the BMI formula (BMI= weight/ height2). The selected students were who have BMI more than 23 will be participants in the study. After that all study participants were tested to determine their physical fitness. Then, the health-related fitness program on overweight were presented to the students. After that the physical fitness test for pre-test was given to the participants. The measurement of health-related fitness for per-test were recorded on 2 Days, (Monday and Wednesday between 7:00 a.m. and 12:30 p.m.). The experimental group also received the physical fitness activity promotion program of 2 sessions per with each session lasting 50 minutes, totalling eight weeks.

Data Analysis

The mean (± standard deviation) and the t-test paired sample compared the baseline (pre-test) with the final (post-test) measurement.

Chapter 4

Research Results and Analysis

Research analysis

The effects of Htee Rue Exercise Program to enhance Health Related Fitness for overweight students at Thai-Myanmar Border

After following the Htee Rue exercise Program the overweight students' health related fitness will be better than before the experiment

Table 1 Gender

Gender	Frequency	Percentage
Male	11	55%
Female	9	45%
Total	20	100%

The participants were made up of 11 Male students and 9 female students. This reflects the breakdown of students in grade 12. No attempt was made to have an equal number of males and females.

Table 2 Comparing physical fitness between pretest and post test

Physical fitness	Physical fitness test	Pretest		Post test	
		$\bar{X}$	SD	$\bar{X}$	SD
Muscular strength	Push up	14.90	8.58	20.20	8.43
Muscular endurance	Sit up	20.60	10.66	27.20	10.25
cardiovascular endurance	Step up and down.	183.43	8.67	249.80	38.89
flexibility	Sit and reach	13.40	6.55	19.30	6.00
body composition	BMI	24.02	0.62	23.00	0.59

Table 3 Muscular strength final mean score for students who participated in physical education before Htee Rue exercise program versus students who participated after Htee Rue exercise program.

	M	*SD*	*t*	*p*
Before	14.90	8.58	-14.582	.000***
After	20.20	8.43		

***p<.05

The dependent samples t test was then conducted. The Muscular strength sores for students who participated in physical education before Htee Rue exercise program Mean score (M=14.90, SD=8.58) then students who participated in physical education after Htee Rue exercise program (M=20.20, SD=8.43). The Mean different of 19 in muscular strength final score was significant=-14.582, p <.000 as is shown in table 3.

Table 4 Muscular endurance final mean score for students who participated in physical education before Htee Rue exercise program versus students who participated after Htee Rue exercise program.

	M	*SD*	*t*	*p*
Before	20.60	10.66	-21.209	.000***
After	27.20	10.25		

***p<.05

The dependent samples t test was then conducted. The Muscular endurance sores for students who participated in physical education before Htee Rue exercise program Mean score (M=20.60, SD=10.66) then students who participated in physical education after Htee Rue exercise program (M=27.20, SD=10.25). The Mean different of 19 in muscular endurance final score was significant t=-21.209, p <.000 as is shown in table 4.

Table 5 cardiovascular endurance final mean score for students who participated in physical education before Htee Rue exercise program versus students who participated after Htee Rue exercise program.

	M	SD	t	p
Before	183.43	8.67	-7.127	.000***
After	249.80	38.89		

***p<.05

The dependent samples t test was then conducted. The cardiovascular endurance sores for students who participated in physical education before Htee Rue exercise program Mean score (M=183.43, SD=8.67) then students who participated in physical education after Htee Rue exercise program (M=249.80, SD=38.89). The Mean different of 19 in muscular endurance final score was significant t=-7.127, p <.000 as is shown in table 5.

Table 6 Flexibility final mean score for students who participated in physical education before Htee Rue exercise program versus students who participated after Htee Rue exercise program.

	M	SD	t	P
Before	13.40	6.55	-19.222	.000***
After	19.30	6.00		

***p<.05

The dependent samples t test was then conducted. The Flexibility sores for students who participated in physical education before Htee Rue exercise program Mean score (M=13.40, SD=6.55) then students who participated in physical education after Htee Rue exercise program (M=19.30, SD=6.00). The Mean different of 19 in muscular endurance final score was significant t=-19.222, p <.000 as is shown in table 6.

Table 7 Body composition final mean score for students who participated in physical education before Htee Rue exercise program versus students who participated after Htee Rue exercise program.

	M	SD	t	P
Before	24.02	0.62	9.859	.000***
After	23.00	0.59		

***p<.05

The dependent samples t test was then conducted. The body composition sores for students who participated in physical education before Htee Rue exercise program Mean score (M=24.02, SD=0.62) then students who participated in physical education after Htee Rue exercise program (M=23.00, SD=0.59). The Mean difference of 19 in muscular endurance final score was significant t=9.859, p <.000 as is shown in table 7.

Chapter 5

Conclusion, discussion, and recommendations

Conclusion

The effects of Htee Rue Exercise Program to enhance Health Related Fitness for overweight students at Thai-Myanmar Border.

1. Hypothesis - after following the Htee Rue exercise Program the overweight students' health related fitness will be better than before the experiment.

Conclusion

The conclusions of the study were as expected and in line with another research on the topic. The result of the Htee Rue exercise programme was to enhance health related fitness for overweight students. Based on this we can conclude that the Htee Rue exercise programme used was an effective way to enhance health related fitness for overweight students a Thai-Myanmar Border.

If we look at the results one by one, we can see that they are very significant improvement, particularly for Muscular strength, Muscular Endurance, flexibility, body composition and Cardiovascular Endurance where the gains were all in the mid-19. Body composition also improved significantly with participants improving but still in the Overweight category. There is still an opportunity to improve to the Normal level, but this may take a longer exercise programme.

Flexibility shows a significantly greater improvement than the other exercises, and again this may be related to how quickly the effects of the different exercises occur. There was a high standard deviation for the cardiovascular exercise, which reflects the fact that some participants showed much bigger benefits than others.

There is an opportunity to do further research about the possible causes of the outcomes which we observed. For example, we could research whether people who had been overweight for a long time improved more slowly than people who had only recently become overweight. However. that was not within scope for the

research program we are now reporting on. The objective of the program was to establish the viability of an exercise program and the outcomes that could be expected from it. All the exercises used in the program made a positive contribution to the program's viability.

Discussion

The research found that.

After following the Htee Rue exercise Program the overweight students' health related fitness was better than before the experiment

The student's health-related physical fitness level in cardiovascular endurance, muscular endurance, muscular strength, flexibility, and body composition found that post-test better than pre-test. Because Htee Rue exercise program for overweight students at Thai-Myanmar Border aimed to develop health-related physical fitness following the theory Kirchner and Fishburne in (1998). It found that the 8-week program improved health-related physical fitness which is a powerful indicator of general health in childhood (Belka., 2004). In children and adolescents, higher fitness levels are associated with positive outcomes for bone health, mental health, overweight, and cardiovascular disease. It is important to note, however, that physical fitness is a hypothetical construct. In the past, research studies assessing health-related physical fitness have included a range of variables, cardiorespiratory endurance (CRE), strength, coordination, and flexibility. Accordingly, a definition of health-related fitness (HRF) was proposed by Deli, Bakle and Zachopoulou, (2006), who suggested that HRF is a multidimensional construct comprising five components). Specifically, these five components are CRE, muscular strength (MS), muscular endurance (ME), flexibility, and body composition. CRE refers to the capacity of the respiratory and cardiovascular systems to carry out continuous strenuous exercise. MS is the ability of the muscular system to produce force against a resistance in one maximal effort Gabbard (2012). Many researchers in the health field choose tests of explosive strength (e.g., horizontal, and vertical jumps), or power, to represent MS as a component of fitness. ME is the ability of the muscular system to produce force over a prolonged period. ME and MS together contribute to

muscular fitness (MF), a term that refers to the ability to do work against a resistance either maximally, explosively, or repeatedly. Flexibility is the range of motion at a joint. Body composition is the physical make-up of the body, often described as the percentage of muscle, fat, bone, and water within the body. This definition of HRF, as a multidimensional construct consisting of five components, is widely accepted, and utilized within health promotion. According to hypothesis, these five components were improved in the program construct because they are affected by physical training and are associated with important health outcomes. The Thoo Mweh Khee Exercise Program has shown that the HRE of the participants improves by 8 weeks. According to Deli. Bakle and Zachopoulou's hypothesis this means that their Health-Related Fitness (HRF) has also improved.,

Recommendation

Benefit of research findings:

1. Thoo Mweh khee learning center administrator should improve overweight student's health-related physical fitness by organizing a health program for students in every semester for student's basic health accordance with their real-life.

2. Thoo Mweh khee learning center staff should recognize about overweight student's health-related physical fitness by improve health program for students in every semester for student's basic health accordance with their real-life.

Next research

1. should study of another program factors on overweight students' health related and students' mental health in Thoo Mweh khee learning center.

2. Should study of physical activities program for overweight students in primary level Thoo Mwek khee learning center.

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Appendix

Health Related Fitness Test

Health Related Fitness Test for TMK students

The health-related fitness tests will be conducted by the teachers using the following form and criteria.

Health Related Physical Fitness Test Form

for TMK Students

Name ..... Gender: Male .....

Female.....

Date of birth ..... Age.....

Grade.....

Any preexisting conditions: _____ no _____ yes

1. Weight (kg)		2. Height (meters)	
3. BMI			
4. sit and reach	1st attempt:	2nd attempt:	Final Average:
5.push up			
6.sit up			
7.step up			

Tester Signature:

_____

Date of test:

_____

Weight

Objective:

- To assess the weight of the body to calculate BMI.

Equipment needed:

- Scales

Testing Method:

1. Take off shoes and jacket. Remove any heavy objects from the pocket before stepping on the scales.
2. Stand still while the weight is being measured.

How to record results:

- Results should be recorded in KG

Height

Objective:

- To measure the height in meters to be used to calculate BMI.

Equipment needed:

- Height Ruler

Testing Method:

- Take off shoes and stand next to the ruler.
- Stand still and in a straight position while the height is measured

How to record results:

- Results should be measured in meters

Body Mass Index

Objective:

- To assess if a person is underweight, if they have a healthy weight, excess weight or obesity

Equipment needed:

- Scales
- Height Ruler
- Calculator

Testing Method:

1) Check the height in meters and the weight in kilograms (see the method above)
2) Multiply the height in meters by itself to get the height in m^2
3) Divide weight in kilograms by height in m^2

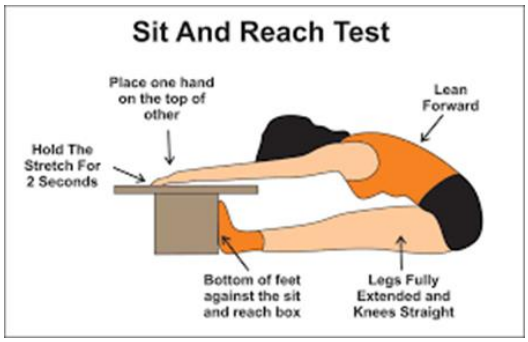
$$BMI = \frac{weight}{Height^2}$$

How to record results:

- Match the above results with the criterion below to find the correct category for the student.

Age (year)	Body Mass Index Fitness Standards									
	Male					Female				
	Very thin	Thin	Average	Slightly overweight	Overweight	Very thin	Thin	Average	Slightly overweight	Overweight
18	13.97 And under	13.98-18.97	18.98 - 23.86	23.87-28.73	28.74 And above	14.18 And under	14.19-19.85	19.86 - 24.62	24.63 - 29.40	29.41 And above

Sit and Reach



Objective:

- To test the flexibility of the hips and the lower leg muscles

Equipment needed:

- Sit and reach box, a box that you can put against the wall that has measurements from -30cm to 30cm.

Testing Method:

1. Get in position: Remove your shoes and sit on the floor with your legs stretched out in front of you with knees straight and feet flat against the front end of the test box.
2. Begin the movement: In a slow, steady movement, lean forward at the hips, keep your knees straight, and slide your hand up the ruler as far as you can go.
3. 3Stretch and repeat: Extend as far as you can, record the result in cm, rest, and repeat three times.
4. Calculate your results: Average your results for your final score.

Testing Regulations:

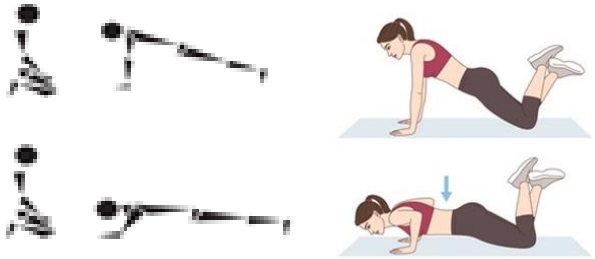
- Knees must remain straight and locked during the test. If knees are bent the test must be performed again and results thrown out
- The student must not rock back and forth to extend their reach.

How to record results:

○ Match the above results with the criterion below to find the correct category for the student.

Age (year)	Sit and Reach Fitness Standards									
	Male					Female				
	Very low	Low	Moderate	Good	Very Good	Very low	Low	Moderate	Good	Very Good
18	8 and under	9-15	16-21	22-28	29 or more	9 and under	10-15	16-22	23-29	30or more

Push-Up



Objective:

- To check strength and endurance of the forearm and upper body

Equipment needed:

- Exercise Mat
- Stopwatch

Testing Method:

1) Begin in a kneeling position on a mat with hands below shoulders and knees behind hips, so the back is angled and long.
2) Tuck toes under, tighten abdominals and bend elbows to lower chest toward the floor. Keep your gaze in front of your fingertips so your neck stays long.
3) Press chest back up to start position.

Testing Regulations:

- Make sure the back is straight while they go down then up.
- The chest should be lowered to the ground.

How to record results:

- Match the above results with the criterion below to find the correct category for the student.

Age (year)	30 Second Push-Up Fitness Standards									
	Male					Female				
	Very low	Low	Moderate	Good	Very Good	Very low	Low	Moderate	Good	Very Good
18	8 and under	19-25	26-32	33-40	40 or more	18 and under	19-24	25-31	32-37	38 or more

Sit-up

Objective:

- To test the strength and endurance of abdominal muscles

Equipment needed:

- Exercise Mat
- Stopwatch

Testing Method:

1) feet anchored by partner or apparatus.
2) knees bent 90°
3) hands clasped behind neck.
4) elbows travel beyond or make contact with knees.
5) The back of shoulders must return to floor.
6) Repeat as many as possible for 60 seconds.

Testing Regulations:

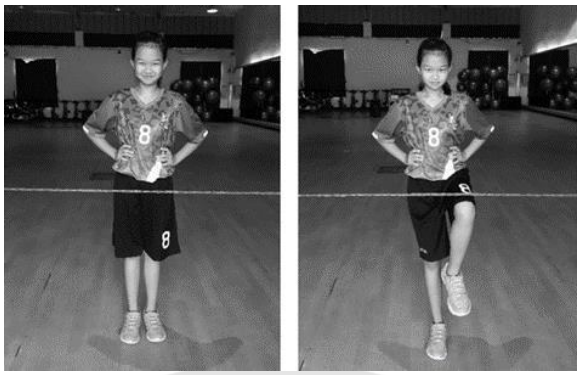
- Elbows need to reach or go past the knees for the sit up to count.

How to record results:

- Match the above results with the criterion below to find the correct category for the student.

Age (year)	60 second Sit-Up Fitness Standards									
	Male					Female				
	Very low	Low	Moderate	Good	Very Good	Very low	Low	Moderate	Good	Very Good
18	22 and under	23-31	32-41	42-51	52 or more	22 and under	23-31	32-40	41-48	49 or more

3 minutes step-up and down



Objective:

- To assess the endurance of the cardiovascular and respiratory system

Equipment needed:

- Long rope to determine the height of the knees.

Testing Method:

1. Start by standing with both feet flat on the ground and arms on hips.
2. When the time starts lift one knee as high as the rope
3. Return the first foot to the ground and lift the opposite knee as high as the rope.
4. Continue this same pattern for 3 minutes.
5. Count 1 when both the left and right knees have touched the rope.

Testing Regulations:

- If the knees fail to touch the rope the step doesn't count
- The participant must not run.

How to record results:

- Match the above results with the criterion below to find the correct category for the student.

Age (year)	3 minutes Step Up Fitness Standards									
	Male					Female				
	Very low	Low	Moderate	Good	Very Good	Very low	Low	Moderate	Good	Very Good
18	108 and under	109-135	136-162	163-187	188	107	108-131	132-156	157-180	181 or more

Program outline

Program length	**8 weeks (8 lessons) (2 hours each lesson) 2×8 = 16 lesson**
program outline	Lesson 1: muscular strength, muscular endurance, and flexibility (Spider Chase game)
	Lesson2: cardiovascular endurance- (catch canned fish game)
	Lesson 3: Muscular strength – (Qing city game) - (pull)
	Lesson 4: Flexibility – (Through the hula hoop)
	Lesson 5: body composition– (Jumping Rope Squad) (running and jumping)
	Lesson 6: cardiovascular endurance – (X- O) game (running and dribble)
	Lesson 7: cardiovascular endurance – (Giant Monkey) Catcher (running)
	Lesson 8: cardiovascular endurance - Throwing the King game (running)

Lesson 1: Title: muscular strength, muscular endurance, and flexibility

Spider Chase game (Crawl and catch)

Grade – 12

Date -

Time – 50 minutes

Lesson objective

- the students reduce their risk of diseases such as diabetes, heart disease, and stroke.
- help to build strong bones, as it is a weight bearing exercise, strengthen muscles, improve their Muscle strength, Muscle endurance and flexibility.

Teaching process

1. Introduction

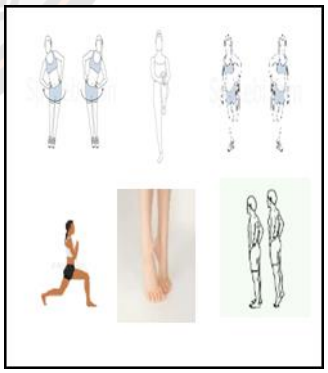
- Talk to the students about the importance of spider chase. Explain to the students how to play spider chase correctly. Tell them the benefits of spider chase game.

2. Warm up

- Do a warm- up exercise to prepare for the task (5 minutes)

https://www.youtube.com/watch?v=dm_ZcK3m1Kk&t=3s

Warm up (5 minutes) (complete 3 sets of all the warm -up below)

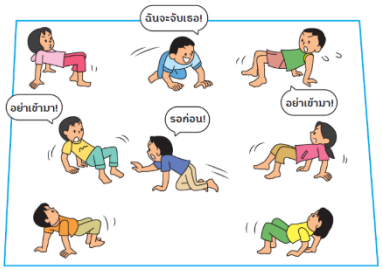


- Toe yoga – 1 time (15 seconds)
- Hip circles – 5 times each side (30 seconds)
- Toe walk – 10 each side (30 seconds)
- Knee to chest -5 times each side (30 seconds)
- Quad pull – 5 times each side (30 seconds)
- Lunge with twist - 5 times each side (30 seconds)

2. **Demonstration**

■ **Activity**

- This activity is a chase, where players must crawl on the ground around in a four-legged manner.
- Let 2-3 players be "chasers" by crawling on the ground to catch the runaway players.
- The player who escapes should crawl face up and crawl around to avoid getting caught.
- Which player gets caught? Instead, they must become "chasers".



รูปที่ 30

Application

- Let the captured players become "chasers" without having to change each other to have more "chasers".
- It may create a safe zone for players to rest, but when the chaser counts 1 – 5, the fleeing player must leave the safe zone immediately.

Caution

The game should be played in the gym, flatbed, or rubber floor.

The size of the playing area should be set to suit the number of players.

3. **Cool- down exercise (5 minutes)**

- Hip stretch – 1 time (20 second)
- Buttocks stretch – 1 time each side (20 second)
- Hamstring stretch – 1 time each side (20 second)
- Quad stretch – 1 time each side (20 second)
- Squatting leg – out - 1 time each side (20 second)
- Back half stretch - 1 time each side (20 second)

4. **Practice**

- After I tell them, the students must practice by themselves.

5. **Game or play role.**

- Finally, start on the command ready? Go. The students must start to do the activities.

6. **Conclusion**

- Discuss spider chase again, ask the students to show you how they are crawling on the ground and crawl on the ground around in a four-legged manner. Ask the students to show you how they crawl correctly. Discuss the benefits of this crawl and crawling on the ground around in a four-kegged. Emphasize the importance of practicing these crawling to help them and improve their Muscle strength, Muscle endurance and flexibility.

7. Teaching media

- Place
- Chalk
- rubber floor.

8. Evaluation

- As the students participate in the activities the teacher will observe them and make corrections as needed. The corrections can be noted to help the students in further classes. Some classes the teacher will have the students observe each other and give feedback to each other to help them understand the skills they are participating in. Students will also be monitored for any health stresses caused by the exercise program and if needed, they will be asked to stop.

Lesson: 2 Title – cardiovascular endurance- catch canned fish game (Run and catch)

Grade – Grade 12

Date -

Time – 50 minutes

Objective

- The students reduce their risk of diseases such as diabetes, heart disease, and stroke.
- help to build strong bones, as it is a weight bearing exercise, strengthen muscles, improve their Muscle strength and Muscle endurance.

Teaching Process

1. **Introduction**

- Talk to the students about the importance of catching the canned fish. Explain to them how to play catch canned fish. Talk to the students about the benefits of catching canned fish.

2. **Warm-up**

- Do a warm-up 5 minutes before the start of the task.
- example of video.

  https://www.youtube.com/watch?v=XFNLugUS4HQ

warm up exercise (5 minutes)

- knee drives – 10 each side (30 seconds)
- shoulder opener – 3 times each side (10) seconds
- knee to elbows – 10 times each side (30 seconds
- hip circles (change side) – 5 times each side (30 seconds
- knee hugs – 5 times each side (30 seconds)
- legs pull - 5 times each side (30 seconds)

cool down (5 minutes) (complete 1 set of all the stretches below)

- Cobra stretch – 5 times (10 seconds)
- Cat Back stretch – 5 times
- Gluteal stretch – 5 times each side (5 seconds)
- Hamstring stretch – 5 times each side (5 seconds)
- Knee to Chest stretch – 5 times each side (5 seconds)
- Kneeling stretch – 5 times each side (5 seconds)

3. **Demonstration**

1. Draw a circle large enough to match the number of players.
2. Assign one player to be the "catcher" by standing outside the circle. The rest of the players stay in the circle.
3. The game begins when the players in the circle say in unison, "I'm going to push and don't cry" and exert pressure backwards.

4. Players who are "catchers" Try to touch players who are in the band or players who have been pushed out. Any player touched must become another "catcher" and stand outside the circle.
5. Any player who steps out of the circle or accidentally falls down until he gets hit. The "catcher" rhyme must become the "catcher".
6. The last remaining player in the circle wins.

4. **Practice**

- After I explain to the students, they must practice by themselves. If they are ready, then they can start to do it.

5. **Game and play roles**

- After they have practiced activities, they must start to do the activity that I told them above. Start on command ready? Go.

6. Conclusion

- Discuss catch canned fish and ask the students to show you how they play catch canned fish correctly. Discuss the benefits of catch canned fish. Emphasize the importance of practicing catch canned fish to help them improve their Muscle strength and Muscle endurance.

7. **Teaching media**

- Place
- Chalk

8. Evaluation

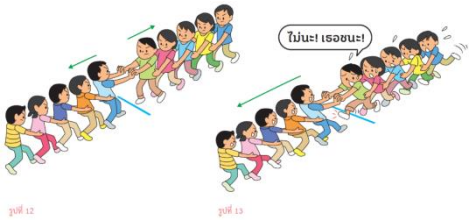
- As the students participate in the activities the teacher will observe them and make corrections as needed. The corrections can be noted to help the students in further classes. Some classes the teacher will have the students observe each other and give feedback to each other to help them understand the skills they are participating in. Students will also be monitored for any health stresses caused by the exercise program and if needed, they will be asked to stop.

Lesson: 3 Title – Muscular strength – Qing city game (pull)

Grade – 12 students

Date -

Time – 50 minutes



Objective

- Muscular strength and endurance are important for many reasons: Increase your ability to do activities like climbing stairs, lifting boxes, or chopping wood without getting tired. This will reduce the risk of injury and help you keep a healthy body weight.

Content

- Before doing this activity, I will ask the students to make a line and I will tell them to listen to me. Then I will explain to them how to play Qing city

Teaching process

1. Introduction

- Talk to the students about the importance of pulling. Explain to them how to pull. Tell the students the benefits of pulling.

2. Warm up - (5 minutes) (complete 3 sets of all the stretches below)

- Neck stretches – 5 each side (5 seconds)
- Triceps stretches – 5 each side (5 seconds)
- Shoulder stretches – 5 each side (5 seconds)
- Toe touches – 10 (5 seconds)
- knee circle – 5 each side
- Ankle circle – 5 each side

2. **Demonstration**

- Activity

1. Divide players into 2 equal teams and let each team choose 1 player as the "district", with the district standing at the front of the line. As for the other players. Stand at the end of the city in a row at the end of the city. Use your arms to hold your torso together.

2. Draw 1 long line to "divide the border" with both teams standing in a row facing each other.
3. When signalling the start of the "district", both teams use cunning and opportunity to shake hands with each other, with the remaining players having to pull their own districts and exert their strength to pull the opposing team's cities into their own territory.
4. Any team that draws another team's district into its own territory wins, or if one team falls apart, it loses.
5. All in all. At the end of the match, the "districts" can be changed, with 3 rounds scheduled to determine the team that wins 2 out of 3.

Cool down: (5 minutes) (complete 1 set of all the stretches below)

While stretching have the students count aloud together

- Cobra stretch – 5 times (10 seconds)
- Cat Back stretch – 5 times
- Gluteal stretch – 5 times each side (5 seconds)
- Hamstring stretch – 5 times each side (5 seconds)
- Knee to Chest stretch – 5 times each side (5 seconds)
- Kneeling stretch – 5 times each side (5 seconds)

4. **Practice**

- After I explain to the students, they must practice by themselves.

5. **Game and play roles**

- Start on the commands “ready” go.

6. **Conclusion**

- Discuss pulling again, ask the students to show you how they are pulling. Ask the students to show you how they pull correctly. Discuss the benefits of pulling. Emphasize the importance of practicing these pulling to help them improve aerobic capacity, decrease resting heart rate, and blood pressure, decrease risk of cardiovascular disease, improve muscular strength.

7**. Teaching media**

- Place
- Chalk

8. **Evaluation**

- As the students participate in the activities the teacher will observe them and make corrections as needed. The corrections can be noted to help the students in further classes. Some classes the teacher will have the students observe each other and give feedback to each other to help them understand the skills they are participating in. Students will also be monitored for any health stresses caused by the exercise program and if needed, they will be asked to stop.

Lesson: 4 Title – (flexibility) Through the hula hoop

Grade - 12

Date -

Time – 50 minutes

Objective

- Hula hooping is a great exercise for burning some extra calories and sculpting your core muscles. Helps bring balance to our life. Benefit for flexibility

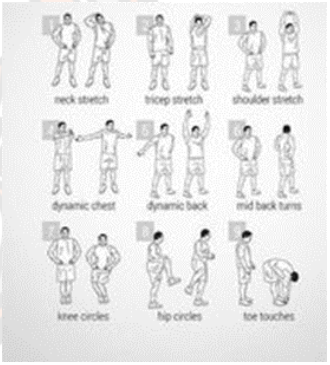
Content

- In this activity, I will tell the students to make a circle and I will explain to them how to play throw the hula hoop.

Teaching process

1. Introduction

- Talk to the students about the importance of throw hula hoop. Explain how to throw the hula hoop properly and tell them the benefits of throw the hula hoop.



2. Warm-up

- Do a warm-up 5 minutes before the start of the task.
- Neck stretch – 5 times each side
- Triceps stretch – 10 - 20 second each side
- Shoulder stretch – 5 times each side
- Dynamic chest – (30 seconds)
- Mid back turns – 5 times each side (10 to 20 seconds)
- Knee circles – 5 times each side
- Hip circles – 5 times each side
- Toe touches – 10 times

3. Demonstration

- **Activity**

1. Set 8 – 10 players standing hand in hand in a circle.
2. Have the first player loop around his arm.
3. When the signal starts, move the hoop overhead and pass the hoop through the torso and pass it to the next player. Continue to do this until the anniversary.

4. Compete as a team, with the team leading the hoop until the anniversary prevails as the winner.

Application

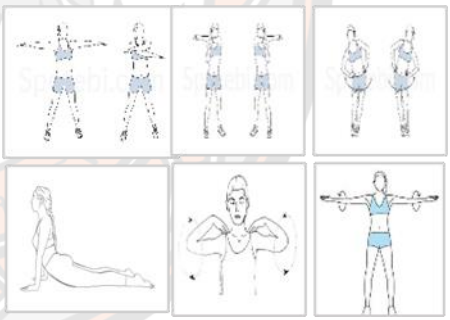
- Players can stand in a straight line instead of standing in a circle.
- Players can use plastic ropes instead of hoops,
- Players can increase the challenge by using smaller diameter hoops.

Caution

- Some players may feel uncomfortable shaking hands with the opposite sex. Event leaders can stand between such players or divide men's and women's teams to avoid shaking hands that can spoil the sense of joy.

Do a cool-down exercise 5 minutes after task –

Stretch (5 minutes)



- Chest expansions – 10 (seconds)
- Arm circles – 10 each side
- Shoulder rotations – 10 each side
- Hip rotation – 10 each side
- Cobra stretch – (10 seconds)

Practice

- After that, the students should practice by themselves.

Game and play role

- Start on the command, “Ready...? Go.”

Conclusion

- Discuss throw hula hoop again, ask the students to show you how they throw hula hoops. Ask the students to show you how to throw hula hoop correctly. Discuss the benefits of throw hula hoop. Emphasize the importance of practicing these throw hula hoop to help them and improve their flexibility.

Teaching media

- Places
- Hula hoop

Evaluation

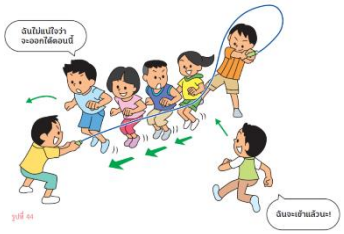
- As the students participate in the activities the teacher will observe them and make corrections as needed. The corrections can be noted to help the students in further classes. Some classes the teacher will have the students observe each other and give feedback to each other to help them understand the skills they are participating in. Students will also be monitored for any health stresses caused by the exercise program and if needed, they will be asked to stop.

lesson: 5 Title - body composition, cardiovascular endurance –
Jumping Rope Squad (running and jumping)

Grade – 12 students

Date –

Time – 50 minutes



1. Objective

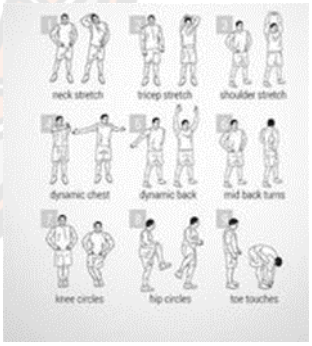
- Running and jumping rope are both excellent forms of exercise. They're cheap and require minimal equipment. Also, they both burn a significant number of calories in a short amount of time. This can help reduce your body fat percentage and improve your body composition.

2. Teaching process

Introduction

- Talk to the students about the importance of running and jumping. Explain to them how to jump rope squad correctly. Tell them the benefits of running and jumping.

Warm-up



- Do a warm-up 5 minutes before the start of the task.
- Neck stretch – 5 times each side
- Triceps stretch – 10 - 20 second each side
- Shoulder stretch – 5 times each side
- Dynamic chest – (30 seconds)
- Mid back turns – 5 times each side (10 to 20 seconds)
- Knee circles – 5 times each side
- Hip circles – 5 times each side
- Toe touches – 10 times

3. Demonstration

1. While 3-4 players are lining up to jump rope at the same time, the next player runs to the end of the line to participate in the jump rope and the player at the front of the line finds a rhythm to run out of the jump.
2. Count how many times you can get in (out) as the game progresses and try to do it multiple times.

Application

1. Start the game with 1 – 2 players jumping in the rope and gradually increasing to 3 – 4 people.
2. Once players get used to jumping rope, it can make the game more difficult by having people in and out happen at the same pace, making the game more fun.
3. When the player gets better, they may change the tempo to jump twice before they enter and exit, allowing the player to enjoy the new rhythm of jumping.

caution

1. Avoid pushing friends in front while running towards the end of the jump line.
2. Let players take turns turning the rope.

4. Practice

- The students must practice after I explain the activities.

5. Game and play roles

- Start on the command “ready? Go.”

Do a cool-down exercise 5 minutes after task.

- Cobra stretch – 5 times (10 seconds)
- Cat Back stretch – 5 times
- Gluteal stretch – 5 times each side (5 seconds)
- Hamstring stretch – 5 times each side (5 seconds)
- Knee to Chest stretch – 5 times each side (5 seconds)
- Kneeling stretch – 5 times each side (5 seconds)

6. Conclusion

- Discuss jumping rope squad again, ask the students to show you how they do jump rope squad. Ask the students to show you how to do jumping rope squad correctly. Discuss the benefits jumping and running. Emphasize the importance of practicing these jumping and running to help them improve and increase muscle mass, stronger bone, weight control.

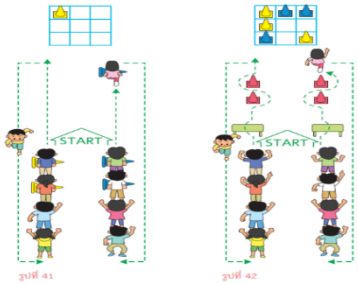
7. Teaching Media

- Places
- Long rope

8. Evaluation

- As the students participate in the activities the teacher will observe them and make corrections as needed. The corrections can be noted to help the students in further classes. Some classes the teacher will have the students observe each other and give feedback to each other to help them understand the skills they are participating in. Students will also be monitored for any health stresses caused by the exercise program and if needed, they will be asked to stop.

lesson: 6 – X- O (running and dribble)



Grade – 12 students

Date -

Time – 50 minutes

1. Objective

- help you perform exercises or movements over extended periods.
- Reducing your risk of many diseases, such as heart and blood vessel conditions.
- Strengthening your heart and lungs

2. Content

- Before doing this activity. I will tell them how to play X – O game correctly. I will show and explain first before doing this activity.

3. Teaching process

Introduction

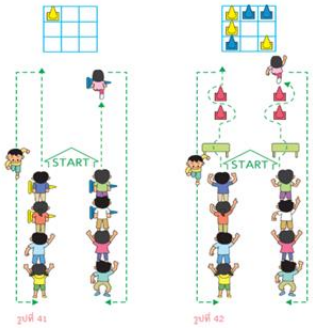
- Talk to the students about the importance of this game. Explain to them how to play X – O game correctly. Also talk to the students about the benefits of this activity.

Warm up (5 minutes)

- Neck stretches – 5 each side (5 seconds)
- Triceps stretches – 5 each side (5 seconds)
- Shoulder stretches – 5 each side (5 seconds)
- Toe touches – 10 (5 seconds)

4. Demonstration

1. Divide players into 2 equal teams. Teams of 3-6 players, each team will receive 3 different coloured rubber cones (other materials such as rings, mugs, etc.)
2. Create a 3X3 table by setting the starting point to play with the table to be about 3 meters apart.



3. Players from both teams stand in a row deep behind the starting point, and the first 3 players of the team will each hold 1 cone (pictured).
4. The rules of play are like X-0, where when signalled, the No. 1 player of the team who starts running places the cone into the grid for no more than 5 seconds (or the time limit to suit the specified distance), then runs back to the end of their team row, circling left or right in the same direction. As the player runs past the starting point, the player The first person in the next place runs to put the cone in the table and back to the end of their team row as well, and alternates like this.
5. The 4th player onwards of each team must run to relocate their team's cone. Only 1 cone can be moved per cycle. Which team can arrange all 3 cones horizontally? Vertical or diagonal is considered the team wins, with 3 rounds scheduled to be played to give the losing team a chance to defend.

Application

1. Increase the challenge by placing cones and fences, zigzagging, or skipping during the run.
2. Increase the difficulty of the game by increasing the distance or reducing the running time to make the game more enjoyable.

caution

1. Beware of the danger of falls and running into each other.
2. It should be played in open ground.

5. Practices

- After I tell them, they must practice by themselves.

6. Games and play roles

- Start on the command “ready” go?

Cool down: (5 minutes) (complete 1 set of all the stretches below)

While stretching have the students count aloud together

- Cobra stretch – 5 times (10 seconds)
- Cat Back stretch – 5 times

- Gluteal stretch – 5 times each side (5 seconds)
- Hamstring stretch – 5 times each side (5 seconds)
- Knee to Chest stretch – 5 times each side (5 seconds)
- Kneeling stretch – 5 times each side (5 seconds)

6. Conclusion

- Discuss running and dribble again, ask the students to show you how they run and dribble in this game. Ask the students to show you correctly. Discuss the benefits of this game. Emphasize the importance of practicing these X-O game to help them and improve muscular strength.

7. Teaching media

- Places
- Chalk
- Cones

8. Evaluation

- As the students participate in the activities the teacher will observe them and make corrections as needed. The corrections can be noted to help the students in further classes. Some classes the teacher will have the students observe each other and give feedback to each other to help them understand the skills they are participating in. Students will also be monitored for any health stresses caused by the exercise program and if needed, they will be asked to stop.

Lesson: 7 Title – cardiovascular endurance - Giant Monkey Catcher (running)

Grade – 12 students

Date -

Time – 50 minutes

Objective

- help you perform exercises or movements over extended periods.
- Reducing your risk of many diseases, such as heart and blood vessel conditions.
- Strengthening your heart and lungs

Teaching process

Introduction

- talk to the students about the importance of running. Explain to them how to play giant monkey catcher properly. Tell them the benefits of cardiovascular endurance.

Warm up –

- Quadriceps stretch – 10 seconds each side.
- Hamstring stretches – 10 seconds each side.
- Adductors stretch – 10 seconds each side.
- Calf raises – 10 second each side.
- Toe touches – 10 (5 second)

Equipment needed:

- Place

Demonstration

- Have 4 players stand in line with both hands on the player's shoulder in front of them.
- Let one player be a "giant" facing the players who are lining up. Then try to catch the last player (monkey) of the line.
- If the row is torn down, the "giant" wins.

- The player who escapes wins only if the player is last in the line (monkey). Not caught at the specified time (about 20 seconds)

Application

- The number of players can be increased.

Caution

Deadlines should be set so that "giant" players are not exhausted or over exhausted.

Have the player at the front end fold their arms or hold their chests. In order not to hinder players who are "giants" while playing.

Practice

- After I explain to the students, they must practice by themselves.

Game and play roles

Start on the command “ready” go?

Cool down: (5 minutes) (complete 1 set of all the stretches below)

While stretching have the students count aloud together

- Cobra stretch – 5 times (10 seconds)
- Cat Back stretch – 5 times
- Gluteal stretch – 5 times each side (5 seconds)
- Hamstring stretch – 5 times each side (5 seconds)
- Knee to Chest stretch – 5 times each side (5 seconds)
- Kneeling stretch – 5 times each side (5 seconds)

Conclusion

- Discuss Giant Monkey Catcher again, ask the students to show you how they do giant monkey catch. Ask the students to show you how to do play giant monkey catcher correctly. Discuss the benefits of giant monkey catcher. Emphasize the importance of practicing this activity to help them and improve their cardiovascular endurance.

Evaluation

- As the students participate in the activities the teacher will observe them and make corrections as needed. The corrections can be noted to help the students in further classes. Some classes the teacher will have the students observe each

other and give feedback to each other to help them understand the skills they are participating in. Students will also be monitored for any health stresses caused by the exercise program and if needed, they will be asked to stop.

Lesson: 8 - cardiovascular endurance - Throwing the King game (running)

Grade – 12 students

Date -

Time – 50 minutes

Objective

- help you perform exercises or movements over extended periods.
- Reducing your risk of many diseases, such as heart and blood vessel conditions.
- Strengthening your heart and lungs

Teaching process

Introduction

- talk to the students about the importance of running. Explain to them how to play throwing the king properly. Tell them the benefits of cardiovascular endurance.

Warm up –

- Quadriceps stretch – 10 seconds each side.
- Hamstring stretches – 10 seconds each side.
- Adductors stretch – 10 seconds each side.
- Calf raises – 10 second each side.
- Toe touches – 10 (5 second)

Equipment needed:

- Place
- Ball

Demonstration

- Divide players into 2 equal teams, then let each team choose a king and let the other team know who the king is.
- Divide the playing area into 2 parts and alternately throw the ball at the opposing team.
- Any player who is hit by the ball must leave the field.
- The team that throws the ball at the opposing team's king wins.

Application

- It's more fun to play as a "mystery king" where players on both teams don't have to inform the opposing team who their king is, so that each player guesses for themselves.
- For fun, balls of different sizes or soft balls can be used, depending on the players' abilities.
- It will be more exciting if played on a smaller pitch.

Caution

- If there are a lot of players in a team, some team players will not have the opportunity to throw the ball, the optimal number of players is 8 players per team, and if the field of play is narrower, everyone has a better chance of throwing the ball.

Practice

- After I explain to the students, they must practice by themselves.

Game and play roles

- Start on the command "ready" go?

Cool down: (5 minutes) (complete 1 set of all the stretches below)

While stretching have the students count aloud together

- Cobra stretch – 5 times (10 seconds)
- Cat Back stretch – 5 times
- Gluteal stretch – 5 times each side (5 seconds)
- Hamstring stretch – 5 times each side (5 seconds)
- Knee to Chest stretch – 5 times each side (5 seconds)
- Kneeling stretch – 5 times each side (5 seconds)

Conclusion

- Discuss throwing the king (running) again, ask the students to show you how they do play this game. Ask the students to show you how to do play giant monkey catcher correctly. Discuss the benefits of running. Emphasize the importance of practicing this activity to help them and improve their cardiovascular endurance.

Evaluation

- As the students participate in the activities the teacher will observe them and make corrections as needed. The corrections can be noted to help the students in further classes. Some classes the teacher will have the students observe each other and give feedback to each other to help them understand the skills they are participating in. Students will also be monitored for any health stresses caused by the exercise program and if needed, they will be asked to stop.

Resources (including pictures) used in the 8 Week Program Lessons:

ACP (Active child Program)

https://tpak.or.th/backend/print_media_file/200/%E0%B8%81%E0%B8%B2%E0%B8%A3%E0%B8%AA%E0%B9%88%E0%B8%87%E0%B9%80%E0%B8%AA%E0%B8%A3%E0%B8%B4%E0%B8%A1%E0%B8%81%E0%B8%B4%E0%B8%88%E0%B8%81%E0%B8%A3%E0%B8%A3%E0%B8%A1%E0%B8%97%E0%B8%B2%E0%B8%87%E0%B8%81%E0%B8%B2%E0%B8%A2%E0%B9%83%E0%B8%99%E0%B9%80%E0%B8%94%E0%B9%87%E0%B8%81%E0%B8%94%E0%B9%89%E0%B8%A7%E0%B8%A2%E0%B8%81%E0%B8%B2%E0%B8%A3%E0%B9%80%E0%B8%A5%E0%B9%88%E0%B8%99%E0%B8%95%E0%B8%B2%E0%B8%A1%E0%B9%81%E0%B8%99%E0%B8%A7%E0%B8%84%E0%B8%B4%E0%B8%94.pdf

Warm-up and Cool Down:

https://www.atipt.com/blog/pre-post-workout-stretches