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Diversity of Ways to Implement Exercise Medicine in Management of Prediabetic and Prehypertension: Malaysian Experiences

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Malaysia needs healthy citizens to ensure the country's economic development effort is sustainable. Although the Ministry of Health has taken various measures to prevent the disease from NCD early 1990s again, unfortunately the number of Malaysians who have NCD risk factors such as obesity and NCDs diseases such as diabetes and hypertension continues to increase. If the NCD disease prevention activities are not strengthened, the number of Malaysians with NCDs will continue to rise.

Through the program "Exercise Medicine", clients who have risk factors for NCDs, which are confirmed by the Medical Officer, will be referred to "Exercise Therapist – (ET)". Priority will be given to those in the category of 'borderline' eg prediabetic / prehypertension / obesity and dyslipidemia. ET will provide treatment for prescription of a scheduled program of physical activity which is specific to an individual based on an assessment carried out by the ET on each individual patient. ET will then implement a program of physical activity and exercise, as well as regular monitoring, and will refer back to client medical officer to assess the effectiveness of the intervention program on a monthly or 3 monthly basis.

After the pilot projects between Ministry of Health and Asia College of Exercise Medicine, an effort had been done to extend this program further and, an initiative was introduced in which a proposed a smart partnership between UniSHAMS, Asia College and the Ministry of Health Malaysia.

UniSHAMS has provided a place (space) to create "Exercise Clinic" as well as provide a place to conduct training for health staff. Some of the basic equipment needed to support physical activity, softwares, tools and exercise are provided by Asia College of Exercise Medicine and in addition two ETs to conduct the clinic. The Ministry of Health provides laboratory services for blood sugar checks and patients referral.

Clients who are "pre-diabetic" or "pre-hypertensive" will be referred to the exercise clinic by the Medical Officer at the nearby Health Clinic. The running of the Exercise Clinic will follow the Work Process Standard (Standard Operating Procedures or SOPs) which have been developed together UniSHAMS, Asia College and the Ministry of Health after getting the consent of the clients

Patients who have been identified to have risk factors for NCDs, in the category of 'borderline' eg prediabetic / prehypertension / obesity and dyslipidemia will be referred to "Exercise Therapist (ET). Using Dr FIT software, the ET will provide treatment for prescription of a scheduled exercise program and specific to an individual based on an assessment carried out by the therapists on the individual.

It's time, to give special focus to “exercise medicine”. This is due to the number of facts that illustrates how important “exercise medicine” is, in NCD disease prevention through which “exercise medicine” is very necessary in our efforts to deal with the burden of NCDs which is the main health burden for all countries in the world.

1- “Exercise Medicines” is the only high risk intervention strategy (specific to individuals) that is used for exercise. All other interventions are classified as population strategy ie not specific to each individual.

2- “Exercise Medicine” has already received recognition from WHO representatives who previously attended the previous Exercise Medicine Conference held in Malaysia. She has encouraged to implement “exercise medicine” in the Primary Health Care program in government clinics.

However, in implementing the exercise medicine, there are several challenges to be observed and settled out before in can runs smoothly,

1- Referring to the “exercise medicine” implementation flow chart, the most important thing is the “software’ to prescribe exercise to patients who have been selected. In relation to this issue, it is suggested that a smart partnership be implemented with the Asia College of Exercise Medicine led by Dr Lee.

2- The need for a trained exercise therapist (ET) to prescribe exercise and be addressed with a smart partnership with Asia collage of Exercise Medicine.

3- Asia College of Exercise Medicine is ready to provide places for those who comply to the requirements, to continue their diploma/degree studies in exercise medicine.

4- It is agreeable that Asia College of Exercise Medicine is ready to provide experienced exercise therapist to run an exercise clinic while waiting for the selected candidates for the exercise medicine course to complete their diploma course.

Pertaining to the diversity of ways to implement exercise medicine in management of selective pre NCDs, several ways of implementation are recommended:

1- The most effective way is to implement “exercise medicine” in the Primary Care Division at the Ministry of Health as what had been implemented in as a pilot project at the Malaysian Ministry of Health. In this way, all cases of prediabetic or prehypertension can be directly intervened because CVD screening is done by the health clinic.

2- Cooperation can also be made by involving universities or NGOs in establishing a smart partnership. In Malaysia, a smart partnership involving UniSHAMS, ACEM and MOH Malaysia have been established whereby UniSHAMS provides the place, ACEM supplies equipment and therapists. while MOH Malaysia refer the client among the among prediabetics and prehypertension.

3- Cooperation can also be made by involving Private Hospitals and General Practitioner (GP) in establishing a smart partnership in implementing the “exercise medicine”. This will indirectly encourage the involvement of GPs in NCD prevention and also conducive towards their popularity.

Therefore, through these various partnerships we are able to extend services so as to implement the program "Exercise for Treatment", especially for those individuals who are diagnosed with "pre-diabetes" or "pre-hypertension" which are currently left without any specific interventions.

Exercise Dosage Intervention For Non-Communicable Diseases

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Background: Non-communicable diseases or NCDs, such as obesity, hypertension and diabetes is one of the primary causes of death in Malaysia. Asia college of Exercise Medicine collaborates with the Ministry of Health Malaysia to establish a program that will help to reduce the risk of non-communicable diseases in Malaysia, especially a person with obesity, pre-diabetes, and pre-hypertension, whereby medical officers will refer patients that been diagnosed with border line of NCD such as Pre-Hypertension, and Pre –Diabetes to the exercise clinic, and exercise will be the 1st line of management before pharmacological intervention.

Method: This study included 13 patients that has different types of risk factor, which is obesity, pre-hypertension, and obesity with pre-hypertension. Based on gender, total male patients is 2 (15%) and total female patients is 11 (85%). Based on the 13 patients, there are 6 (46%) young adults patient and 7 (54%) middle-age adults patient. This intervention been run for 3 month which we monitor and measure the patient's data based on their BMI (Kg/m2), Body fat percentage (%), Weight (kg), and Blood pressure (mmol/L). Each patient will go through PFA (physical fitness and assessment) ones a month for data collection and to monitor patients improvement. Method that been use during the intervention is Target Heart Rate (THR) and physiological of reps. Patient's condition and level of activity, will determine patient's intensity for cardio session. Each patient will walk on a treadmill (Dr. fit Treadmill) for 30 minutes and every 5minute, patient's heart rate will be taken. During cardio session, data collection is based on heart rate for every 5-minute, Target Heart Rate (THR), Maximum Heart Rate (MHR), Heart Recovery (HRR), and Heart Rate Return (HRrtn). For resistance training, patients will go through MVC which is known as Muscular inventory contraction, that will determine patient's load or how heavy patient have to lift and how many repetitions during the exercise based on patient's program exercise.

Result: 3 months of intervention, the result is based on min which shows that the min for patient's BMI decrease by 1.92%, min for Body fat percentage decrease to 4.09%, min for

blood pressure for systolic decrease by 25.54%, min for blood pressure diastolic decrease by 10%, and min for weight decrease by 5.12%.

Conclusion: In conclusion, every person needs to be aware on their health condition and start to do exercise or doing any physical activity that will helps to increase they health and avoiding from any border line of NCD that will lead to NCD. These results are important because it shows to every citizen, how exercise help to reduce the risk of NCD, because this intervention aims to improve health outcomes and NCD management in Malaysia and to encourage every citizen to do daily physical activity and exercise.

Scientific, Personalized, And Quantitative Exercise Prescriptions In The Prevention Of NCDs

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Exercise prescription has been practiced since ancient times. Hippocrates recorded that "with the right amount of nourishment and exercise, not too little and not too much, we would have found the safest way to health" Sushruta from India documented about role of exercise for hypertension and diabetes in 600 BC. Now a few centuries later we are still struggling to sell exercise as a" low cost, low tech, *non-drug" intervention to find better health.*

Exercises are often poorly prescribed and implemented due to several reasons which can be justified by looking at the prescriber and client's related viewpoints. Prescribers with insufficient knowledge and skills may not ensure that the exercise design is suitable, individualized, tailored to a person's specific needs, goals, fitness level, and medical history. Poorly designed exercise program that lacks progression, variety or proper intensity leads to boredom and plateaus. Another prescriber problem is setting unrealistic, unachievable goals which can frustrate and demotivate clients. Failure to take into consideration existing health conditions and injuries leads to add-on injuries hampering proper exercise being carried out. Leaving clients to fare on their own after a prescription too can demotivate them. An inadequate support system either from family or provider can make it challenging for clients to stay motivated and accountable.

On the other hand, clients too can sabotage the exercise prescribed. Clients often struggle to stick to prescribed exercise due to time constrain, lack of motivation, and lack of resources or poorly designed exercises. Health-related problems such as arthritis and excessive body weight and other medical problems can hamper compliance to exercise. Lack of system and social support from family and friends can also demotivate client's desire to stick to exercises prescribed.

Non-communicable diseases, inclusive of heart disease, stroke, cancer, diabetes and chronic lung disease, etc., are responsible for 74% of deaths globally. Exercise is one of the gold standards for the prevention and management non-communicable diseases according to World Health Organization (WHO). Current RCTs evidenced, exercise and other interventions are strong recommendations to combat NCDS. There now an urgent need for healthcare systems

globally to create the necessary infrastructure, knowledge, skills and conducive environment to ensure that prescribed and supervised exercise can be, and is, prescribed as medicine to prevent and treat NCDs.

To ensure exercise prescription is properly carried out is has to be scientific meaning it has to use evidence-based practices to develop the exercise and tailored to an individual's specific needs and goals. Prescription must follow guidelines that are, researched on, proven safe and effective; specific to conditions and individuals.

There is a vast body of evidence supporting the scientific principles in exercise prescription. Principles such as; overload, specificity, individuality, recovery, reversibility and rest.

Quantitative exercise prescription means applying specific numerical values to exercise after assessment of the individual's ability. It is to determine the appropriate intensity, duration, frequency, and mode of exercise for an individual to achieve desired optimal results. Several methods can be used to quantify exercise prescription such as using the heart rate, rate of perceived exercise, METs and 1RM.

Personalized exercise prescription is a specific exercise planned and designed to meet an individuals unique needs, goals, ability, purpose and preferences. Well-designed exercise program will increase individual's motivation and adherence to exercise programs and reduce risks of injury.

Taking all the guidelines into consideration, the components of a well-planned scientific, quantitate and personalized exercise prescription should include frequency, intensity, time, type, volume and progression that is the FITT-VP principle.

Telemedicine As A Tool For Lifestyle Changes Including Physical Activity In Adolescents With Obesity: Family And Group Intervention

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Introduction: Obesity is a multifactorial disease that is influenced by genetic, metabolic, psychosocial-economic, and environmental factors. A complex care for patients with obesity is time-consuming and requires a comprehensive approach of multidisciplinary team that incorporate physical activity, nutritional, behavioural, and psychological counselling. Identification of effective strategies to promote and maintain healthy lifestyle in adolescents and their families is, therefore, desirable.

Purpose: **CA**rdio**M**etabolic **P**revention (CAMP) pilot study aims at studying the effectiveness of combined intervention - In-Person and Telemedicine in the treatment of obesity and cardiometabolic complications in adolescents with at least one adult family member.

Methods: Adolescents with obesity aged 12-19 years with unhealthy lifestyle, each with at least one family member, were included in the study. Detailed history and thorough physical, laboratory, and anthropometry examinations were performed. One day in-person group educational session on healthy lifestyle for adolescents and family members were provided. Wristbands that monitor daily steps were distributed among all participants. A 12-week supportive telemedicine follow-up phase includes nutritional therapy counselling, physical activity coaching and cognitive-behavioural therapy. Subsequently, a group in-person session takes place in order to re-evaluate all indices and parameters from baseline.

Results: Twenty adolescents (11 ♀, 9 ♂) were enrolled, of which 16 participated in the in-person evaluation and in whom statistical analyses had been performed. The program was associated with a significant decrease in body mass index z-score, waist circumference and concentrations of triglycerides. After the intervention, there was a tendency to decreased depression score and improved physical well-being evaluated by KIDScreen questionnaire.

Conclusion: The ongoing study of combined In-Person and remote multidisciplinary treatment of childhood obesity shows promising preliminary results.

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Key words: obesity, adolescents, telemedicine

Every Move Count, But How Much is Too Much?
What is the Optimal Physical Activity Dosage for Health?
Translate Currently Scientific Evidence into Practical Actions.

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According to the key facts reported by WHO, the biggest threat to human health, noncommunicable diseases (NCDs) kill 41 million people each year, equivalent to 74% of all deaths globally. The major four NCDs are cardiovascular diseases (CVD), cancer, chronic respiratory diseases, and diabetes, and kill 17.9 million, 9.3 million, 4.1 million, and 2.0 million people respectively annually, which account for more than 80% of all premature NCDs deaths. Metabolic risk factors such as hypertension, overweight/obesity hyperlipidemia, and hyperglycemia lead to an increase in the risk of NCDs. Tobacco use, physical inactivity, unhealthy diet, and the harmful use of alcohol, four modifiable behaviors all increase the risk of NCDs, and merely insufficient physical activity cause 830,000 deaths annually (WHO, 2022a). Insufficiently active people have a 20% to 30% increased risk of death compared to those who are sufficiently active. Globally, there are more than 80% of adolescents and 25% of adults do not meet the global recommended levels of physical activity (WHO, 2022b). The physical activity and sedentary behavior guidelines and recommendations for adults are summarized as below in Table 1 (WHO, 2020c).

Table1: Summary on 2020 WHO physical activity recommendations for adults

PA recommendations	Adults aged 18–64 years	Adults aged 65 years and above
Moderate aerobic PA	at least 150–300 minutes a week, more than 300 minutes for additional health benefits	Same as for adults
Vigorous aerobic PA	at least 75–150 minutes a week, more than 150 minutes for additional health benefits	Same as for adults
Muscle-strengthening	2 or more days a week	3 or more days a week

activities		
Functional capacity and balance		varied multicomponent physical activity emphasizes functional balance and strength training 3 or more days a week,
Other	Sit less and move more through the day	Sit less and move more through the day

As the summary shown in Table 1, the guideline & recommendation PA a week for adults mainly revealed “at least” moderate, vigorous aerobic and muscle-strengthening or balance activities for adults aged 18–64 years and above. There is no “the optimal”, “the most or upper limit” PA volume, or “the optimal proportion of combination for moderate and vigorous activities” a week in the guideline and recommendation for health or disease prevention. Moreover, the WHO PA guideline highlights every move count, and both moderate- and vigorous-intensity PA improve health (WHO, 2022b). In fact, in addition to both moderate- and vigorous-intensity PA, previous studies have shown that short and frequent light-intensity PA throughout the day significantly reduced postprandial glucose and insulin levels compared with sitting, and more than 150 min/week at least 12 weeks of light PA reduced adiposity, improved blood pressure and lipidaemia, more time spent in daily light PA reduced risk of all-cause mortality as well (Chastin et al., 2019).

For past decades, mounting epidemiological research on the effect of exercise or physical activity on morbidity and mortality has been extensively conducted. And thanks to the contributions of the systematical review and meta-analysis research, the critical marks on the physical activity of intensity, duration, frequency, and total volume on the risk of disease and mortality could be derived from these research results. Particularly, because some of them even included more than a hundred specific cohort population samples, the results of this scientific evidence appear to be more convincing and inspiring to practical action for promoting physical activity.

Therefore, this presentation intends to summarize “light or non-moderate-vigorous PA improves health” and “how light PA works”, “the optimal”, “the most or the upper limit” and

"the optimal combination of moderate and vigorous" PA volume a week for health based on current study results and scientific evidence, and then propose the practical PA action a week for adults.

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Psychological Benefits of Exercise for Type 2 Diabetes Mellitus Patients

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The increased prevalence and implications of Type 2 Diabetes Mellitus (T2DM) have made it a global public health concern. By the year 2030, it is expected that 366 to 438 million adults worldwide (7.8% of the adult population) will have T2DM. The World Health Organization describes T2DM as a non-communicable disease (NCD) that frequently has a protracted duration and is the result of an interaction of genetic, physiological, environmental, and behavioral factors. To date, obesity and physical inactivity are common problems for T2DM patients. Therefore, the purpose of this study is to examine the psychological advantages of exercise for T2DM patients, with a focus on the relationships between exercise, mental health, and the treatment of T2DM-related distress.

Over the past century, physical activity (PA) has grown to be essential to establishing and sustaining a healthy lifestyle. PA has long been regarded as the cornerstone of managing T2DM, in addition to diet and medicine. The psychological well-being of T2DM patients has been shown to be improved by regular physical activity, which has been associated with decreased feelings of anxiety and depression as well as increased self-esteem and self-efficacy. These benefits of PA may be attributed to its physiological and psychological effects, which include the release of endorphins and the ability to divert attention from negative thoughts and emotions (Hidrus et al., 2022).

However, several challenges and barriers to PA adherence among T2DM patients exist, which must be addressed to optimize the psychological and physiological benefits of PA. These include a lack of motivation, a fear of hypoglycaemia, and limited access to healthcare resources and exercise facilities. Tailoring exercise programs to individual preferences and abilities, providing proper education about blood glucose management during exercise, and utilizing technology-based interventions may help overcome these barriers.

Researchers have used the Transtheoretical Model (TTM) and Brain Breaks video technology to assess T2DM patients' readiness for starting and maintaining PA (Hidrus et al., 2022). The TTM is a comprehensive model that was created to support behavioral changes in individuals who felt prepared to take on new, healthier habits. It offers recommendations or changes measures to assist these individuals. TTM is made up of decisional balance, self-efficacy, stages of change, and processes of change. The Brain Breaks video technology is a web-based, structured PA break that promotes people's health and learning. It is also specifically created for the individual or group setting to motivate individuals to improve their mental skills and also provide the opportunity to learn new motor skills, languages, arts, music, and cultures during breaks (Kuan et al., 2019).

In conclusion, exercise plays a pivotal role in promoting psychological well-being among T2DM patients. Its benefits extend beyond physical health by reducing symptoms of depression and anxiety, improving self-esteem, and enhancing overall mental well-being. Furthermore, the TTM and Brain Breaks videos create a positive mindset and motivation towards an active lifestyle in people with T2DM. Therefore, it is crucial for researchers and healthcare practitioners to comprehend the psychological advantages of exercise for T2DM patients in order to establish efficient intervention techniques that completely meet their demands.

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Power of Mind to Increase Adherence to Exercise Regimes

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ABSTRACT

Train your mind, and your body will follow. The real workout starts with the thoughts you feed your soul. The strength of your muscles is limited, but the power of your mind is limitless. Your body can withstand almost anything, it's your mind that you must convince. Believe in your potential and watch your fitness soar. Visualization is your strongest workout tool. See yourself succeeding and your body will follow suit. You body achieves what your mind believes. Cultivate a mindset of success, and your exercise journey will know no bounds. Progress is built on consistency, and consistency is a product of your disciplined mind. Train your thought, train your body. The mind-body connection plays a significant role in achieving fitness goals. Mind power plays a crucial role in adhering to exercise regimes. One's mindset and mental attitude have a significant impact on your ability to stay consistent, motivated, and committed to your fitness goals. Developing and maintaining a positive mindset can greatly help in adhering to an exercise regime. Some tips to cultivate a positive mindset are: -

1. Setting positive intentions: Remind oneself of the benefits such as improved energy, strength, or mental well-being. Focus on the positive outcomes rather than dwelling on any perceived challenges.

2. Practice Positive Self-Talk: Be mindful of your self-talk during exercise. Replace negative thoughts or self-criticism with positive and encouraging statements. Remind yourself of your capabilities, progress you've made, and the effort you're putting in.

3. Find Joy in the Process: Shift your focus from solely outcome-oriented goals to finding joy in the exercise itself. Embrace the physical sensations, enjoy the music or surroundings, appreciate your body, and cultivate a sense of gratitude for being able to exercise.

4. Celebrate Small Wins: Acknowledge and celebrate even the smallest achievements along your exercise journey. It will boost motivation and confidence.

5. Surround Yourself with Positivity: Surround yourself with positive influences and environments like uplifting social media accounts, online communities of like- minded individuals, supportive workout buddy who can provide encouragement and accountability.

6. Visualize Success: Take a moment to visualize yourself successfully completing your exercise routine and achieving your fitness goals. It can help enhance focus, motivation, and belief in your ability to adhere to your exercise regime.

7. Practice Meditation: Incorporate mindfulness techniques into your exercise routine. Pay attention to your body, breath, and sensations during the workout. Be present in the moment, fully engaging with each movement and appreciating the benefits it brings to your body and mind.

8. Reflect on the Positive Impact: Regularly reflect on the positive impact on your overall well-being like your strength, stamina, mood, or stress levels. Keep a journal to note these positive changes.

9. Embrace Challenges as Growth Opportunities: It will help you develop resilience, determination, and a deeper understanding of your own capabilities.

10. Be Kind to Yourself: Practice self-compassion throughout your exercise journey. Treat yourself with kindness, understanding and forgiveness.

Remember that progress takes time and setbacks are normal. Treat yourself with the same kindness and encouragement you would offer to a friend. There can be various reasons why people struggle to adhere to exercise regimes. The common factors that may contribute to difficulties in maintaining consistency are: -

Lack of motivation, unrealistic expectation, lack of time, lack of support, boredom or lack of variety, physical discomfort or pain, Mental and emotional barriers, lack of planning or structure, negative experiences or past failures, environmental factors. Everyone's circumstances and barriers may differ. By understanding these common reasons, individuals can identify the specific factors affecting adherence and work towards finding solutions. Tailoring the exercise regime, seeking, and implementing strategies can help improve adherence to create a sustainable exercise routine. Some ways to increase adherence to exercise regimes are: -

Set realistic goals, find activities you enjoy, establish a routine, mix it up, find a workout buddy, track your progress, reward yourself, make it social, be flexible, listen to your body. Remember, adherence to an exercise regime is a personal journey. It is important to find what works best for you and to approach it with a positive mindset. Successful sports personalities often possess specific mindsets that contribute to their ability to adhere to exercise regimes consistently. Some key mindset traits commonly found are: Discipline and determination, goal orientation, positive self-belief, strong work ethic, resilience, focus and concentration, perseverance, self- motivation, positive mindset and mental toughness, love, and passion for the sports. While these mindset traits are commonly found in successful athletes, it's important to remember that everyone's journey is unique. Developing these qualities takes time, effort, and self-reflection. Adopting a positive and determined mindset can contribute significantly to adherence and success of an exercise regime.

Magic of Meditation

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ABSTRACT

Introduction: Mind is known to play a key role in achieving success in the field of sports. Well-known elite-athletes, such as Michael Phelps and Lanny Bassham, have highlighted the role of mind power when they performed at the peak of their careers. The world now accepts the role of meditation in enhancing physical performance, concentration, and focus, which are of great importance to a sportsperson. In addition, the impact of meditation in healing-physically and mentally, enhancing self-motivation, and overcoming pain is also documented, but less explored.

Purpose: Using meditation can help calm the mind and hasten the healing of the body as it improves our control over thoughts and emotions. Hence, we present an overview of simple Rajayoga meditation techniques to help sportspersons achieve enhanced performance and quicker recovery from injuries.

Methods: Traditional breathing techniques help in creating awareness of the thoughts; however, to enhance mental strength, the "thought muscle" needs to be developed. The technique of easy Rajayoga meditation requires a focused synchronization of thoughts and senses, that is, the senses of sight, sound, smell, touch, and taste should become attuned to the thoughts. With clarity and repetitions, the subject experiences a sense of awareness of what's happening inside, including which body organ feels stretched or injured, which emotion is pulling one down and what motivation do they seek. The first step of self-awareness is like a root cause analysis which can be subsequently used to advance the meditation practice with an aim to resolve the cause of discomfort, pain, and disease.

Results and Discussion: Without proper training of the mind, individuals often drain their mental power due to mood swings, self-discouragement, low self-esteem, overconfidence, and even lack of work-life balance. This severely affects body's ability to perform, and recover after a strenuous workout or injury, which is especially important for sportspersons. To access the internal, vital source of energy meditation is a proven, natural, and effective way.

Conclusion: Meditation is a skilful process of channelizing the thought energy toward positively disciplining the mind, develop a power to relax, and recover both the mind and body. Meditation helps to perform under pressure and rejuvenate at will to give optimal physical, emotional, social, or intellectual performance.

Keywords: Healing, Meditation, Mind-body, Positive imagery

Exercise prescription for Ageing Women – Challenges, Considerations, and Guidelines

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ABSTRACT

The percentage of aged population is fast growing worldwide. Aging women experience very unique physical, physiological, and psychological changes. While women transit beyond the age of 50 years, maintaining wellness becomes a serious concern. The formulation of exercise prescription for this population poses unique challenges and considerations that must be carefully taken into account to achieve the best desired outcome. The important challenges in aging women are physiological changes such as decreased muscle mass, bone density, and hormonal imbalance that would increase the risk of Osteo arthritis and Osteoporosis. These challenges require personalized exercise prescription with a blend of balanced intensity, duration and frequency in accordance with their health status and fitness levels. The exercise prescription must follow holistic approach that interplay between physical, physiological, psychological, and social factors as they hinder adherence to regular exercise. Considering these, suitable tailor-made programs with flexible workout schedules with integration of stress management techniques will be effective to achieve the desired goals of wellness. The guidelines to formulate tailor made exercise prescription should be based on comprehensive assessment of medical history, initial fitness, joint mobility, and cognitive abilities. It is important to set individualized health goals and integrate endurance, strength, flexibility, and balance components with progressive training load to improve functional capabilities without injury risk. Proper emphasis should be on weight bearing and resistance exercises that would reduce risk of injuries and also on mind body integrative activities like Yoga to improve mental wellness. The aging women must be given enough social support to adhere to regular exercise and it is very important to create awareness about benefits of regular exercise and motivate them. It can be concluded that formulating tailor-made exercise prescription for aging women is critical in promoting their wellness and functional independence. By understanding the challenges faced by this population, fitness experts and health-care professionals can formulate guidelines and personalized exercise prescription for them to lead active, quality, independent, and fulfilling lives.

Dose response profile to improve cardiovascular fitness

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ABSTRACT

Research during the past several years confirms the health benefits of regular physical activity, including better cardiovascular function with reduced risks of morbidity and mortality from cardiovascular heart disease (CHD). The growing research evidence also shows that the same physical exercises induce varied outcomes across persons. Try to better know this interindividual difference in response to acute and regular physical exercising, most research, so far, has focused on non-modifiable factors such as sex and different genotypes, while quite little attention has been paid to exercise prescription as a modifiable factor. With a modified exercise prescription, dosage can be made comparable across individuals, a procedure that is necessary to better understand the dose response relationship in exercise. This improved understanding of dose response relationships could help to design well-organized physical training approaches for cardiovascular fitness. Hence, the purpose of this lecture is to shed light on differences in exercise prescription and their relation to the dose and the interindividual variations in cardiovascular fitness.

Effects of exercise-based rehabilitation on reducing the risk of myocardial ischemia in patients with Coronary Artery Disease (CAD).

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Background: The most common clinical manifestation of coronary artery disease is myocardial ischemia which can be categorized as an imbalance between myocardial oxygen supply and demand. The concept of supply and demand in myocardial oxygen utilization emphasizes and underlines the physiologic parameters that control the delivery and consumption of oxygen by the heart. The highest oxygen consumption or peak oxygen uptake can be measured during exercise and has been shown to be a useful prognostic measurement to risk stratify patients with Coronary Artery Disease (CAD). Patients with CAD frequently have a lower peak VO2 and left ventricular ejection fraction (LVEF). Exercise-based rehabilitation frequently improves both parameters by causing cardiovascular adaptations such as increased vascular resistance, coronary blood flow, oxygen carrying capacity. These advancements have major clinical consequences, since they increase systolic wall tension, cardiac contractility, heart rate demand, thus improving myocardial demand in CAD patients.Despite numerous studies demonstrating the beneficial impact of exercise training on patients with CAD, there is a significant gap in the literature regarding the precise characteristics of optimal exercise-based rehabilitation protocols for effectively increasing peak VO_2 and LVEF, as well as a thorough exploration of associated safety considerations.

Purpose of study: To determine if exercise training genuinely affects peak VO_2 and LVEF in CAD patients. Understanding the effect of exercise training on these factors might give important insights into enhancing CAD therapy and prognosis.

Methodology: Using certain criteria, which exercise training we found relevant studies from PubMed, MEDLINE, Google Scholar, CINAHL, and SPORTDiscuss within the current 10

years (2013-2023). Prospective randomized or controlled trials and human research in English with no publication restrictions were included, using the search term 'exercise training, peak VO_2, coronary artery disease patients and left ventricular ejection fraction (LVEF). A total of 263 participants from 5 intervention studies, including 178 exercise groups and 85 control groups, were included in the study. Statistical software Review Manager (RevMan) 5.5 software was used for data analysis. Data used was continuous and reported as mean and standard deviation. A 5% level of significance and a 95% confidence interval (CI) to report changes in outcome measures.

Result: 3 studies with 5 interventions were included in the study of exercise training groups that evaluated Peak VO_2 exercise training versus control, and the increase in peak VO_2 was greater in exercising individuals (mean difference [MD], 3.31 mL/ kg / min; 95% confidence interval [CI], 1.25, 5.36; P=.002). The statistical analysis confirmed these findings, with the computed p-value (P) standing at a very significant. Two (2) studies measured the effect of LVEF on CAD patients on exercise training versus control, and the increase of LVEF is in exercising individuals (mean difference [MD], 3.24 mL/ kg / min; 95% confidence interval [CI], -4.01, 10.49; P<0.38). Notably, the p-value (P) was 0.38, indicating no statistical significance difference. There were no obvious differences in TESTEX scale scores on study quality. There were no hospital admissions and adverse cardiac event in both groups and no deaths were reported, from any of the exercise groups or control groups.

Discussion: This significant gain in peak VO_2 shows that exercise training improves cardiovascular fitness by improving the body's ability to supply oxygen to the muscles during physical activity. The reported effect size is a clinically significant advantage for CAD patients, as peak VO2 is a crucial metric that represents functional capability and prognosis in this population. Oxygen's role as an important component in cellular respiration has a significant impact on the body's metabolic supply and demand, allowing efficient energy creation (ATP) to meet physiological demands in CAD patients.

Conclusion: A new meta-analysis comparing exercise-based rehabilitation to control groups in individuals with coronary artery disease (CAD) discovered substantial cardiovascular benefits. Exercise boosted aerobic capacity and function, which might improve prognosis and tolerance thus reducing the risk of myocardial ischemia in patients with Coronary Artery Disease (CAD). It highlights exercise's potential as a CAD therapy, emphasizing the importance of customized treatments for optimum benefits.

Gender differences in sports injuries: A retrospective case study at our hospital

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ABSTRACT

Objective: The aim of the study was to investigate gender-specific differences in the types of injuries sustained in sports activities in males and females at our center. Methods: Injuries sustained in sports in professional athletes in cricket, football, volleyball, tennis, badminton, and track and field sports were analyzed. Data on age, sex, activity level, type of sports, and sports injury were collected. The proportions of common injuries caused by sports activities were investigated, and gender-specific differences in the types of common injuries caused by sports activities were clarified. The Fisher's exact test was used to determine the significance ($P < 0.01$) of the gender-specific differences in the types of sports injuries.

Results: Ten-year data between the periods from June 2013 till June 2023 were collected. Total of 538 athletes were seen aged between 22 and 38 years of age. The most common injuries seen were in the knee joint, followed by ankle joint and lumbar spine. Among these injuries, a significantly higher proportion of females presented with an ACL injury, compared with their male counterparts ($P < 0.001$).

Conclusion: The findings of this retrospective study suggest that there are gender-specific differences in ACL injuries sustained during sports.

Keywords: ACL injuries, Gender, Sports activities etc.

Whys and How's of Exercise for Heart Failure

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Traditional management of heart failure focuses on pharmacological enhancement of heart function, though stroke volume, ejection fraction and cardiac output may improve, they may not be always reflected with correspondingly better exercise tolerance and lesser dyspnea. This is because traditional pharmacological therapy does not affect concomitant pathological changes in skeletal muscles, known as peripheral myopathy. They include thickening of basal membranes, lower mitochondrial density and activity of enzymes of aerobic energy pathways and hypersensitive ergo receptor. Altogether they negatively affect endothelial function, appropriate blood distribution and may markedly contribute to decreased exercise tolerance of heart failure patient. Similarly transplant patient after may not perceive relieve expected from new fully functional heart. Exercise, namely combination of endurance and strength training have been shown to have a positive effect on pathological changes within peripheral myopathy and consequently to patient´s exercise tolerance as well as values of proBNP, considered to be an indicator of cardiac function. Despite of traditional restrictive attitude of medical community, exercise intervention should a part of complex management of patients with heart

Impact Of Exercise Type And Dosage On Pain And Disability In People With Knee Osteoarthritis Secondary To Obesity

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Osteoarthritis (OA) is the leading cause of chronic disability among older adults. Most common form of Osteoarthritis is the Knee Osteoarthritis followed by hip and hands. Knee OA is the most frequent cause of mobility dependency and diminished quality of life. Knee OA is estimated to affect approximately 250 million people worldwide. Most people with OA are of working age, with more than half being younger than 65 years of age, and the prevalence of OA is expected to continue its dramatic increase in the future. Most common features of knee OA are pain, joint stiffness, limitation in movement and is severe cases functional disability. OA is a significant barrier to physical activity, due to activity-related pain associated with this disorder.

Obesity is a major risk factor for knee OA. The association between obesity and knee osteoarthritis, and specifically the role of obesity as a risk factor for knee osteoarthritis has been well documented. The potential mechanisms to link obesity and knee osteoarthritis is both biomechanical and metabolic. It has been established that weight loss for obese patients with knee osteoarthritis is clinically beneficial, for pain reduction, and for improved function.

People with knee OA who are obese and have muscle weakness experience more pain and activity limitation than those with weak muscles who are non-obese. There is increasing recognition that people with knee OA and concomitant obesity form a distinct subgroup of knee OA, and may benefit from a personalized exercise approach

The optimal exercise program, characterized by type and intensity of exercise, length of program, duration of individual supervised sessions, and number of sessions per week, for reducing pain and patient-reported disability in knee osteoarthritis secondary to obesity should be tailored individually rather than one size fits all approach.

There are two types of exercise programs prescribed for people with Knee osteoarthritis, non-weight bearing (NWB) exercises and weight bearing (WB) exercise. Randomized control trail comparing the effects of weight bearing and non-weight bearing exercises for 12 weeks suggests that people with obesity (body mass index (BMI) >30 kg/m2) experienced greater

knee pain relief with the NWB exercise program on a 100 mm visual analogue scale than with the WB program. The plausible reason may be that the Forces applied through the knee during WB activities can be several times body weight or more. Therefore, the higher a person's weight, the greater the load placed on the knee joints during WB exercise. But WB exercise potentially provide benefits over and above those of NWB exercise for some secondary outcomes such as knee strength and function.

Among all the exercises Aerobic exercise, resistance exercise and performance are proven beneficial. Single exercise type with 3 or more sessions per week and at least 12 supervised sessions, seemed to be more efficacious in reducing pain and disability than those with less than 2 sessions per week. An optimal duration of 30 minutes to 45 minutes of exercise during each session is beneficial. Supervised sessions enhances the benefits of exercise regardless of age, sex, BMI, radiographic status, or baseline pain when compared to home based exercise.

Knee OA secondary to obesity impacts quality of life, physical activity, and disability. Therefore, an evidence-based approach is greatly needed to address the future burden and associated costs of not only symptoms and impairments in OA, but also physical inactivity. Tailored exercise program helps to reduce the pain and disability associated with Knee osteoarthritis secondary to obesity.

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Comparison between Frequency, Intensity and Duration of Core Strength Intervention on Pain Severity and Trunk Extensor Performance in Chronic Non-Specific Low Back Pain amongst Malaysian Workers

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Introduction Low back pain (LBP) is a prevalent and debilitating condition that affects a large portion of the global population. It is estimated that up to 80% of adults will experience LBP at some point in their lifetime, making it one of the leading causes of disability and missed work days (Chou et al., 2007). The economic burden of LBP is significant, with the direct and indirect costs of LBP estimated to be billions of dollars each year (Yelin, 2003). The etiology of LBP is complex and multifactorial, with risk factors including poor posture, prolonged sitting, physical inactivity, obesity, aging, muscle imbalance, and occupational demands (Hoy et al., 2014). The impact of non-specific low back pain (NSLBP) can be disturbing, with chronic NSLBP having a significant impact on an individual's quality of life and ability to perform daily activities (Maher, Underwood, & Buchbinder, 2017).

Exercise, in particular, has been shown to be an effective strategy for the management of chronic NSLBP, with numerous studies demonstrating the benefits of core strengthening exercises (Akhtar, Karimi, & Gilani, 2017; Cho, Kim, & Kim, 2014; Hayden, Ellis, Ogilvie, Malmivaara, & van Tulder, 2021; Kumar, Kumar, Nezamuddin, & Sharma, 2015; Narouei et al., 2020). These studies shown a diverse of core training approaches although they all share a common goal with mutual targeted core muscles such as transversus abdominis (TrA), multifidus (MF), paraspinal, abdominal, diaphragmatic, and pelvic musculature in order to improve the neuromuscular control, endurance, and strength of central muscles to maintain a dynamic spinal stability of individuals with chronic NSLBP (Akhtar et al., 2017; Amit, Manish, & Taruna, 2013; Cho et al., 2014; Inani & Selkar, 2013; Kumar et al., 2015; Nadler et al., 2002; Narouei et al., 2020; You, Kim, Oh, & Chon, 2014).

This preliminary study aimed to assess the effectiveness of the 360° TitaniUM Core Strength Exercise© on both pain intensity and trunk extensor performance amongst chronic non-specific low back pain (NSLBP) in Malaysian government sector workers. Participants with chronic NSLBP were randomly assigned into either the interventions or control group. Participants in the intervention groups received a 12-week program of the 360° TitaniUM Core Strength Exercise© with progressively increased on the frequency, intensity, or duration of training, while the control group received no treatment. The inclusion criteria were: (1) Government related workers based in Negeri Sembilan, (2) Aged 18-60 years with suspected or with chronic NSLBP, and (3) Low active lifestyle. Pain intensity and trunk extensor performance were assessed at pre-intervention and post-intervention. The results showed a significant improvement in pain intensity and trunk extensor performance in all intervention groups compared to the control group, with the intervention duration group and intervention intensity group indicated a superior improvement, respectively. Although the intervention groups experienced a great reduction in pain intensity, no statistically significant difference was observed between all groups. Whereas there was a significant interaction between time and groups on trunk extensor performance between all the interventions and control group. These findings suggest that the 360° TitaniUM Core Strength Exercise© with appropriate dosage of exercise is an effective core exercise program for managing chronic NSLBP.

Keywords: 360° TitaniUM Core Strength Exercise©, chronic non-specific low back pain, Malaysian government sector workers

Strategies to increase Physical Activity

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ABSTRACT

Global physical activity level has been stagnating since the 2000s, with around 80% of adolescents and 28% of adults not achieving the recommendations. As a result, a pandemic of physical inactivity is occurring, with far-reaching health consequences along with a substantial economic burden, it has been reported that 10% of all deaths, from NCDs, can be attributed to physical inactivity. There are 300 million school-going and 80 million out-of-school children in India between the age group of 5–18 years. A survey of Indian Council of medical research has indicated that 20% of children are is overweight or obese; another survey indicated that 40% of primary school children are underweight and obesity in 12–19 years and the number has tripled since 1970. About 90% of Indians believe that schools and workplaces are responsible for creating a healthy and active environment. Several studies have shown that extending of focus beyond academics to sports and other activities improves classroom attendance and interest in studies. Sports and physical activity require innovative and scientific model which can play a crucial role in the implementation of health-related SDGs and further help in the achievement of "Healthy/fit India." Sports science and technology in India have changed the way sport is and physical activity are played and perceived. India has developed a sports ecosystem that is leading to increased participation in sport and physical activity. Government of India has taken number of strategical measures for the development of sports and physical activity. India has launched Fit India plan to achieve health-related SDGs through sport and physical activity. Application of scientific research and innovative technology on or off the field has impacted sport outcomes in a profound way and is essential to sporting success. However, India need to make an impactful change by strategical planning and execution on building a sports and fitness culture in the country, to create a generation of fitter, healthier kids, socially aware, and have the right life skill. A sustainable model for holistic fitness of children and youth needs to be designed which can include more innovative approaches, collaboration between school and community, multidisciplinary approach. Redesigning curriculum of schools by incorporating physical activity such as yoga, dance and sport to promote fitness, and cognitive development. Increasing physical activity requires a systems-

based approach. There cannot be one single solution, there is a need to diagnose and make improvement the way the Physical activity system performs its required function, for different population across all life stages.

Keywords: Healthy fit, Innovative technology, Physical activity

Social Aspects of Exercise and Benefits to Learning

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Inactivity is a global trend that causes various problems for societies around the world. The most evident problems are often seen in the increasing amount of physical health problems, especially those related to non-communicable diseases as a result of the lack of daily bodily movement. Also mental health problems can be associated with inactive lifestyle, as physical activity and exercise can enhance mental wellbeing. Studies (e.g. Kantola et al 2013; Haapala et al 2017) have shown that physical activity correlates positively also with learning and academic success, especially with mathematics, reading and writing skills, together with cognitive functionality and good classroom behavior. It is thus world-wise accepted that exercise can be used as medicine to prevent and cure many illnesses, and it has also other positive effects on cognitive functionality.

Despite these above mentioned facts, people of the modern world, do not live in a vacuum without other than purely individual influences, nor do human beings always act rationally, but are instead influenced by structural, cultural and social determinants of their habitable

surroundings. It is known for example that even though people are aware of the dangers of tobacco or misuse of alcohol, they still smoke and drink too much. Or even though people know about the benefits of exercise or healthy food, they still remain sedentary or eat junk food. Therefore, in order to benefit from the knowledge of the scientific knowledge on exercise it is also important to recognize the social aspects that attach exercise and physical activity to their cultural and societal features.

There is a widespread belief that sport (broadly defined) has the power to make 'society' more equal, socially cohesive and peaceful (Spaaij 2009). It is also recognized that social impact of exercise can be seen and measured in society in different ways depending on the cultural meaning structures and norms of the society. As examples of the extremes of the differences in this continuum, Anglo-American cultures may value competition, winning and achievements when it comes to the inner logic of sport and exercise, whereas east cultures (broadly defined) may value exercise more as a channel to mental and spiritual mindfulness. Referring to Lee, Cornwell and Babiak (2013) I define in my presentation social impact of exercise according to the five following aspects, namely social capital, collective identities,

health literacy, wellbeing and human capital, through which I aim to highlight the role of social impact of exercise. First, social capital refers to the social relationships and conditions including trustworthy and diverse networks, social proactivity and participation in community to conducive to cooperation for mutual success in society. The role and significance of non-profit sport clubs with motives of doing something good for your community serves as an example. Sport clubs are nowadays challenged by the lack of volunteers as physical culture is turning into a commodity-based activity with dependence on solvent customers. A strong civic society is a key factor in producing social capital through sport and exercise. Second, collective identities is a related element and includes sense of belonging to a social group or community reflecting self-categorization with positive attitude and important self-concept in a social context. In addition to the traditional sport clubs, also customer relationships, for example in fitness clubs may serve as an example. In addition, national identity and belonging are classic examples of the collective function of sport. Thirdly, health literacy translates to an individual's functional, interactive and critical ability to understand and use healthcare information to make appropriate health decisions. Health literacy

is connected to any literature and level of education in society. The higher the level of literacy and education in general, the more prone citizens are expected to gain knowledge about the impacts of exercise. Fourthly, well-being means harmonious life quality in both psychological and economic aspects for human function and development. It is a fact that health correlates with higher socio-economic backgrounds. Therefore, it is necessary to enhance democratic and economic developments in societies in order to enable exercise possibilities to as many citizens as possible. Finally human capital relates to the attributes of individuals in terms of knowledge, skills, competencies, and attitudes conducive to personal development and societal well-being.

Post-modern societies are constructed around sedentary lifestyles in which screen time and high calorie nutrition cause illnesses and premature functional incapacities. In many urban, over-crowded and motorized living surroundings, natural and spontaneous physical activities are difficult to participate. In addition to the scientific knowledge on physical and mental impact of exercise it is important to pay more attention to the social impact in order to utilize the benefits of exercise for the wellbeing of individuals and thus societies more broadly.

Considerations for the Type and Dose of Exercise in Cancer Patients: Lifelong Exercise for Healthy Joints

Dr. Ciaran Fairman

Cancer diagnosis and treatment can significantly impact the physical and mental well-being of patients. As a result of improvements in the detection and treatment of cancer has resulted in an improvement in survival statistics in a variety of cancers.(1-3) An unfortunate consequence of the improved survival from cancer, is that there is an ever-growing number of individuals burdened by the persistent side effects of cancer treatments, often lasting long after treatment has been completed.(4-7)

Exercise has been recognized as a potential intervention to mitigate the negative effects of cancer and its treatments. Research over the past few decades has highlighted the potential benefits of exercise for cancer patients, including improvements in physical functioning, quality of life, psychological well-being, and even disease-specific outcomes.(8-10) However, determining the appropriate type and dose of exercise for cancer patients requires careful consideration of individual patient characteristics, cancer type, treatment modalities, and potential risks.

This talk aims to provide an overview of the key considerations involved in determining the appropriate exercise prescription for cancer patients. Here, we outline two of these key considerations:

1. Identifying outcomes of interest.

When considering the optimal dose of exercise for individuals with cancer, we are inherently asking "what is the best" type/dose of exercise. The intuitive response is: "best for what". Unfortunately, there are a variety of phycological and psychological side effects from cancer treatments, including reduced body composition, cardiovascular impairments, loss of strength and function, dyspnea and peripheral neuropathy, amongst others. As such, the exercise type and dose that is "best" to optimize improvements in cardiovascular health is likely substantially different that that which would optimize muscle strength/function. Further still, the morbid rates of physical inactivity are only made worse by a cancer experience, which makes a strong case for a focus on the adoption and maintenance of exercise as a primary outcome.(11-13)

That in itself would dictate a different composition of activity prescription to facilitate behavior change with a view to maintaining activity long term. Ultimately, one of the first things to do when deciding on the type/dose of exercise in cancer is determining what the primary focus of the prescription is.

2. Identifying the best timing of the intervention

Theoretically, intervening as early as possible is likely to be optimal to improve outcomes of interest. For example, the "prehabilitation" phase typically defines the period of time between diagnosis and treatment, where the goal is to increase fitness as much as possible, to improve the robustness of an individual and protect against physical decline. Though optimal in theory, this time period is exceptionally difficult for individuals diagnosed with cancer. Often times, they are dealing with the emotional impact of a cancer diagnosis, and the life challenges that accompany it. Further, depending on the type/stage of cancer, the window of time between diagnosis and treatment can be very short, meaning there may not be a sufficient duration to time to illicit positive changes prior to treatment. Contrastingly, the time during which individuals are actively receiving treatment requires an exceptional level of flexibility in the programming of the type and dose of exercise during treatment, as individuals are burdened with intense fluctuating symptoms from treatment, including fatigue, nausea, sleep and mood disruptions, amongst others.

Ultimately, The exercise prescription should be personalized based on the patient's baseline fitness level, medical history, cancer type, and treatment regimen. A multidisciplinary approach involving oncologists, physiotherapists, and exercise specialists is crucial to ensure a safe and effective care.

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