



PHYSICAL FITNESS: HEALTH AND WELLNESS

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Abstract:

Physical fitness is integral to overall health and well-being, particularly in childhood, serving as a key indicator of health. It encompasses the body's ability to perform daily physical activities without fatigue and efficiently handle work and leisure tasks. Achieving physical fitness requires engaging in regular physical activity and adopting measures to promote fitness. It comprises metabolic, health-related, and skill-related components. Metabolic fitness includes factors like blood pressure, pulse rate, and blood insulin levels. Health-related components encompass cardiovascular fitness, muscular strength, endurance, body composition, and flexibility. Skill-related aspects include agility, balance, coordination, speed, strength, and reaction time. Health is not merely the absence of disease but a state of complete physical, mental, and social well-being, while wellness involves actively pursuing choices for a successful existence, focusing on both physical and mental health. Physical fitness and wellness are essential for a balanced and fulfilling life, with each individual striving to maintain their fitness for ease in daily tasks. Although health and wellness are closely related, they are distinct concepts, with wellness representing the pursuit of health.

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Introduction

The term physical fitness refers to the aspect of physical fitness that is an individual's assumed or measured physical work capacity, defined as the maximum level of physical work of which an individual is capable. "Physical work capacity, a measure of aerobic capacity, is reported in terms of oxygen consumption per kilogram per body weight per minute, and increases with physical training. Individuals who participate in frequent physical activity are consistently shown to have higher physical work capacity values (oxygen consumption/ kg/min.) than their sedentary counterparts and are said to be more physically fit" [1]. Exercise is a subset

of physical activity that is planned, structured, and repetitive and has as a final or an intermediate objective i.e. the improvement or maintenance of physical fitness [2].

Physical activity and physical fitness are closely related in that physical fitness is mainly, although not entirely, determined by physical activity patterns over recent weeks or months. Genetic contributions to fitness are important but probably account for less of the variation observed in fitness than is due to environmental factors [3]. Physical fitness benefits are widely recognised and extend across many domains of wellness. A variety of health benefits are associated with physical fitness. Being physically fit reduces the risk of



cardiovascular disease, colon cancer, diabetes, dying prematurely, and obesity [4]. In addition to improving psychological factors like depression, anxiety, stress, and self-confidence, bone and musculoskeletal function also improves. Furthermore, higher levels of physical activity and fitness are linked to improvements in work, recreation, and quality of life. Many children and adolescents in developed countries lead sedentary lifestyle, with reduced active leisure activities, and increased reliance on sedentary lifestyle [5].

Health

The WHO developed what has become the most commonly referenced definition of health: “a state of complete physical, mental and social well-being and not merely the absence of disease.” This definition recognizes that health is more than physical health, and efforts to improve health thus should be comprehensive [6].

Wellness

Wellness is defined as the sense that one is living in a manner that permits the experience of consistent, balanced growth in the physical, spiritual, emotional, intellectual, social, and psychological dimensions of human existence [7].

Physical fitness

Physical fitness is a set of attributes that are either health- or skill-related. Being physically fit has been defined as the ability to carry out daily tasks with vigor and alertness, without undue fatigue and with ample energy to enjoy leisure-time pursuits and to meet unforeseen emergencies [8]. The degree to which people have these attributes can be measured with specific tests. Physical fitness measures are closely allied with disease prevention and health promotion; thus, it is common and appropriate to measure components of physical fitness before preventive and rehabilitative programs [9]. Physical fitness can be modified through regular physical activity and exercise. Physical fitness components have been shown to have a significant positive relationship with

enhanced outcomes in physical activity, including sports participation [10].

Components of Physical Fitness

Physical fitness can be broadly divided into Metabolic fitness, Health-related and Skill-related fitness.

Metabolic Fitness

It depicts the physiological systems' state of health when they are at rest.

Blood pressure: It indicates indirect measuring the effectiveness of the heartbeat, adequacy of blood volume and presence of any obstruction to vascular flow through the use of sphygmomanometer and a stethoscope. Normal BP is 120/80 mmHg.

Pulse rate: It is the number of throbbing sensations felt over a peripheral artery when the heart beats. Normal ranges from 60 to 100 pulse per min.

Blood insulin: Insulin test measures blood samples for the amount circulating insulin, responsible for blood glucose usage by surrounding tissue. Normal values are 5 to 20µm/mL while fasting. Lower than normal values suggest Type 1 diabetes and above normal level suggests Type 2 diabetes [11].

Health-Related Fitness

Good health has a strong relationship with health-related components of physical fitness because it determines the ability of an individual to perform daily activities with vigor and demonstrate the capacities associated with low risk of premature development of the hypokinetic diseases [9]. It is also known as physiological fitness.

Body Composition

Body composition can be expressed as the relative percentage of body mass that is fat and fat-free tissue using a two-compartment model. It can be measured with both laboratory and field techniques that vary in terms of complexity, cost, and accuracy. Anthropometric methods are: Body mass index, Circumferences and Skinfold measurements. Hydro densitometry weighing, plethysmography are some of the methods used in laboratory for measurements [9].



Skin fold thickness: measurements involve measuring skin and subcutaneous adipose tissues at several different standard anatomical sites around the body and converting these measurements to percentage body fat.

$$\% \text{ Body fat} = (\text{fat weight} / \text{total body weight}) * 100$$

BMI: key index for relating a person's body weight to height. $BMI = M / (H * H)$, where M= body mass in kilograms and H= height in meters (A higher BMI score usually indicates higher levels of body fat).

Waist to hip ratio: measured using a tape measure around the waist and the largest hip circumference. The ratio is a simple calculation of the waist girth divided by the hip girth [11].

Muscular Fitness

It includes muscular endurance and strength. The variables of bone mass, glucose tolerance, musculo-tendinous integrity, and ability to carry out ADLs is determined. Muscle function tests are very specific to the muscle group tested, the type of contraction, the velocity of muscle movement, the type of equipment, and the joint range of motion [9].

Muscular Strength: It is the muscle's ability to exert force at high intensities over short periods of time. Static or isometric strength can be assessed by using various devices such as dynamometer and tensiometers. 1 repetition maximum (1-RM), the greatest resistance that can be moved through the full range of motion in a controlled manner with good posture, is the standard for dynamic strength assessment [9][11].

Muscular Endurance: It is the ability of muscle group to execute repeated contractions over a period of time sufficient to cause muscle fatigue, or to maintain a specific percentage of the maximal voluntary contraction for a prolonged period of time. Muscular endurance indicates the capacity of a muscle group to sustain repeated contractions over an extended duration, causing to ultimate muscle fatigue. Alternatively, it comprises the capacity to maintain a specific percentage of the maximal voluntary contraction for an extended period. This facet of fitness is crucial

for activities requiring prolonged muscle engagement, such as endurance running, swimming, or cycling. Improving muscular endurance not only enhances performance in such activities but also aids in daily tasks that demand repetitive movements, such as lifting, carrying, or prolonged standing. Furthermore, enhancing muscular endurance contributes to overall functional fitness, reducing the risk of injury and enhancing the quality of life by facilitating greater ease in performing physical tasks. Incorporating targeted training regimens aimed at enhancing muscular endurance can yield significant benefits, including increased stamina, improved muscle tone, and enhanced overall physical resilience.

Absolute muscular endurance is the total number of repetitions at a given amount of resistance is measured. Relative muscular endurance is the number of repetitions performed at a percentage of the 1-RM (e.g.: 75%) which is in both pre- and post-testing [9].

Cardiorespiratory Endurance

Cardiorespiratory fitness is related to the ability to perform large muscle, dynamic, moderate to high intensity exercise for prolonged periods. This facet of fitness is revealing of the efficiency with which the cardiovascular and respiratory systems collaborate to deliver oxygen to working muscles and eliminate waste products over extended durations of physical activity. It is an important measure of overall endurance and stamina, indicating an individual's ability to maintain performance levels during long exercise sessions. Enhancing cardiorespiratory fitness is essential for improving athletic performance, supporting weight management, and promoting overall cardiovascular health. However, it plays an important role in lowering the risk of chronic diseases such as heart disease, stroke, and diabetes, underscoring its significance in fostering long-term well-being. The performance depends upon the functional state of the respiratory, cardiovascular, and skeletal muscle systems. The criterion measure of cardiorespiratory fitness is



determined by maximal oxygen uptake (VO_2 max) [9]. The best measure of cardio-respiratory fitness is VO_2 max, volume (V) of oxygen used when a person reaches his or her maximum (max) ability to supply oxygen (O_2) to muscle tissues during exercise [11].

Flexibility

Flexibility refers to the ability to move a joint across its full range of motion, a vital aspect for both everyday activities and athletic endeavors. Its significance extends to the performance of Activities of Daily Living (ADLs) and athletic prowess. Various factors contribute to flexibility, including the stretchability of the joint capsule, the effectiveness of warm-up routines, and the viscosity of muscles. It's essential to recognize that flexibility is precise to each joint, meaning that no single test can comprehensively evaluate overall body flexibility. A combination of tests is needed to provide a comprehensive evaluation of joint's range. These nuances helps in tailoring flexibility training programs and identifying areas for improvement, thereby optimizing physical performance and reducing the risk of injury. Goniometers, inclinometers, electrogoniometers, the Leighton flexometer and tape measures are some common devices to measure flexibility in degrees. Sit and reach test is one of the flexibility teststo measure the flexibility of hamstring [9].

Skill-related Fitness

It is also known as performance-related fitness components. It is associated with athletic competition but should be considered in the overall fitness of all individuals. These components are pertaining with the athletic ability of an individual. There are 6 components of physical fitness: balance, co-ordination, agility, speed, power, and reaction time.

Balance

Balance is the ability of an individual to maintain their line of gravity within their base of support. It can be classified into static and dynamic. Balance is control by three

different system: somatosensory, visual and vestibular system[12].

It can be assessed by various outcome tools such as berg balance scale, etc [13].

1) One leg stance test: Individual is asked to stand on 1 leg for 10s with eyes open or closed.

2) Sharpened Romberg's test: Individual stands with both feet in tandem (feet touching heel to toe) with eyes closed to mask the problem with balance.

3)Time up and Go test: This balance test measures the time needed to rise to standing from a chair, walk 3m, turn, walk back to chair and sit down [11].

Coordination

It is the ability to use the senses, such as sight and hearing, together with body parts in performing motor tasks smoothly and accurately [9]. Alternate hand wall toss test is one the test via which co-ordination can be assessed.

The Finger to Nose test is specifically designed to evaluate the fluidity and coordination of arm movements [11]. During the test, the participant is trained to repeatedly touch their nose with their index finger from the outstretched arm at the start. This evaluation not only measures the precision and timing of the movements but also provides insights into motor control and spatial awareness. By observing the execution of this task, clinicians can detect any irregularities in motor coordination, which show neurological conditions or damages.

Power

Power is the degree of the rate at which an individual can exert maximum force, reflecting their ability to generate strength and speed in physical movements. Vertical jump test and hop test are some examples of power testing for lower extremity. Additionally, the medicine ball throw test serves as an effective method for evaluating upper extremity power, providing insights into the strength and coordination of arm and shoulder muscles [10]. These tests offer valuable insights into an individual's power capabilities, aiding in the assessment of physical performance and athletic potential.



Agility

Agility is defined as “a rapid whole-body movement with change of velocity or direction in response to a stimulus”[14]. It performs a series of explosive power movements in a rapid succession in opposing directions.

Reaction time

Reaction time is related to the time elapsed between stimulation and the beginning of the reaction to it[8]. Reaction time is affected by several variables including attentive, cognitive and motor functions. Three basic reaction time paradigms have been described:

1. simple reaction time has a single stimulus and a single predefined response,
2. recognition reaction time has several false stimuli mixed with one correct stimulus prompting the response, and
3. choice reaction time involves multiple stimuli and differing responses for each stimulus[15].

Speed

It relates to the ability to perform a movement within a short period of time. Speed combined with strength will provide power and force. Sprint test is one of the examples of the test that can be used to examine person's speed.

Conclusions

The physical fitness plays a vital role in upholding overall health and well-being, particularly during childhood, acting as an important pointer of one's health status. It involves the capacity to perform daily physical activities effortlessly and effectively achieve various tasks at work and during leisure time. Attaining physical fitness needs consistent engagement in physical activity and the adoption of strategies to improve fitness levels. The components of physical fitness encompass metabolic, health-related, and skill-related aspects, each contributing to overall wellness. Health is more than just the absence of illness; it encompasses complete physical, mental, and social

well-being. However, wellness includes actively making choices to lead a successful life, emphasizing both physical and mental health. Maintaining physical fitness and wellness is crucial for a fulfilling and balanced life, with individuals striving to uphold their fitness levels to enable daily activities. While closely related, health and wellness are different concepts, with wellness representing the ongoing pursuit of optimal health.

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