# THE IMPORTANCE OF CARDIORESPIRATORY FITNESS AND PHYSICAL ACTIVITY AMONG ADULTHOOD STAGES—REVIEW

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ABSTRACT. Introduction: Adulthood is a period of development and transformation, though it may not be as dramatic as childhood and adolescence. Physical changes, for example, from youth to adolescence, are transformative. The body proliferates and develops secondary sexual characteristics as adolescence progresses. Exercise training for the elderly has been linked to a variety of health benefits, including a reduction in cardiovascular mortality. Changes in the balance of the cardiac autonomic nerves result in an increase or relative innervation of the vagus nerve, an explanatory mechanism that may be involved after exercise. Regular physical activity has also been linked to improving mental health (for example, reducing stress, anxiety, and depression). Mental health is critical for preventing and managing cardiovascular disease, but it also impacts other chronic diseases (such as diabetes, osteoporosis, hypertension, obesity, cancer, and depression). Conclusions: Finally, this review unifies the relationship between physical activity, cardiorespiratory health, and adulthood across the life span. In adulthood, changes in daily physical activity have a significant impact on overall health and well-being. As people's corporeal and psychological health care deteriorates with age, regular physical activity becomes crucial for well-being.

Key words: Physical activity, Cardiorespiratory fitness, adulthood.

**REZUMAT.** *Importanța fitness-ului cardiorespirator și a activității fizice în rândul adulților—review.* **Introducere:** Vârsta adultă este o perioadă de maturizare și schimbare, deși poate să nu fie la fel de dramatică precum copilăria și adolescența. Schimbările fizice, de exemplu, de la copilărie la adolescență, sunt transformatoare. Antrenamentul pentru vârstnici a fost legat de o varietate de beneficii pentru sănătate, inclusiv o reducere a mortalității din cauza bolilor cardiovasculare. Modificările în echilibrul nervilor autonomi cardiaci au ca rezultat o creștere sau o inervație relativă a nervului vag, un

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mecanism explicativ care poate fi implicat după efort. Activitatea fizică regulată a fost, de asemenea, legată de îmbunătățirea sănătății mintale (de exemplu, reducerea stresului, anxietății și depresiei). Sănătatea mintală este esențială pentru prevenirea și gestionarea bolilor cardiovasculare, dar are un impact și asupra altor boli cronice (cum ar fi diabetul, osteoporoza, hipertensiunea, obezitatea, cancerul și depresia). **Concluzii:** În cele din urmă, această recenzie unifică relația dintre activitatea fizică, sănătatea cardiorespiratorie și vârsta adultă de-a lungul ontogenezei. La vârsta adultă, schimbările în activitatea fizică zilnică au un impact semnificativ asupra sănătății și bunăstării generale. Pe măsură ce sănătatea fizică și mentală a oamenilor se deteriorează odată cu vârsta, activitatea fizică regulată devine crucială pentru obținerea bunăstării.

Cuvinte cheie: Activitate fizică, Fitness cardiorespirator, vârsta adultă.

### Introduction

An emerging theory and research line show that thriving growth is essential for successful adolescent development and transition to adulthood. A thriving orientation can be defined as a positive process—internal promotion and relationship support—individuals shaping and participating in their development environment, no matter what environment they live in, to develop the life trajectory of the list of abilities, skills (Szabo et al., 2020a; Szabo et al., 2020b; Szabo et al., 2020c; Tulbure et al., 2020), and behaviors. At the identical moment, it is appropriate for self and society (Benson & Scales, 2009; Benson et al., 2006; Lerner, 2004; Scales et al., 2000; Scales et al., 2015).

Due to the significant impact on adult socioeconomic achievements, family life, and health, the changeover to maturity has recently received much scholarly attention (Shanahan, 2000; Settersten et al., 2005; Benson & Furstenberg, 2007; Settersten & Ray 2010; Waters et al., 2011; Booth et al., 2012). This transformation in the US is characterized by its long-term nature and increasingly personalized quality, making it more unstable and uncertain than the previous queue (Shanahan, 2000). Higher education increases youth's living and financial dependence on their parents and delays full-time employment and people establishment (particularly parenting). The loose institutional link among university and job (Schneider & Stevenson 1999; Kerckhoff, 2002; Shanahan et al., 2002) is accompanied by a general increase in non-standard employment relationships, which reduces the remuneration for dynasty establishment in obtaining and maintaining the ability to provide sufficient work (Kalleberg et al., 2000; Kalleberg, 2011; Eliason et al., 2015).

The stage of development from adolescence to adulthood is itself a necessary stage of life, but it is also important because it lays the foundation for later adulthood (Arnett, 2000; George, 1993; Hogan & Astone, 1986; Shanahan, 2000). Think of young or emerging adulthood as the period among 19 and 26 phases of age. It is also believed that emerging adulthood can last until 29 (Arnett et al., 2011). The worldwide adolescent advancement discipline generally believes that youth refers to the phase from premature youth to 30 years of age or later (United States Agency for International Development, 2012). However, the age range is not an entirely satisfactory sign because it has been found that different people in the same age range consider themselves to be real adults. For example, the "emerging" label applies to people who do not think they are fully grown-ups, while "young adult" applies to people of the same age who think they are adults. (Blinn-Pike et al. 2008; Scales et al., 2015).

### The adulthood stages

### The early/emerging adulthood stage

Teenage maturity is a period of maturity and alteration, even though the level of transformation might not be as dramatic as childhood and adolescence. For instance, the corporeal transformations from childhood to adolescence are transformative. As adolescence progresses, the body proliferates and develops secondary sexual characteristics. As an adolescent's transition from adolescence to manhood, corporeal transformations occur, but gradually. Individuals begin to gain a steady weight, which will define adulthood, but the transformations appear not as sudden as when puberty begins (Cole, 2003; Zagorsky & Smith, 2011; Committee Improving the Health, Safety and Well-Being of Young Adults, 2015).

Except for infancy, no other life stage will experience such energetic and challenging transformations at the private, societal, sentimental, neuroanatomical, and educational levels. Most emerging adults have changed their living conditions, significant relationships, complete education or career preparation, marriage, childbirth, and transition from adolescent/dependent roles to adult/independent roles in the ten years between 20 and 30. Emerging adults usually depend on others at the commencement of a phase, are between 17 and 18, live by their begetters or caregivers, establish romantic relationships, and go to high school. In the mid to succeeding 20-s, particularly evolving grown-ups are self-sufficient, have long-run friendships, and enjoy a clear career path at the close of this phase. When they penetrate this phase of existence, their private, relative, and societal resources, the dynamics and interactions between emerging adults and their surroundings, and their assistance will affect how they pass a phase of existence. Therefore, at this stage, young people and young people can take a variety of ways to achieve stable adulthood (Wood et al., 2018).

Arnett defines emerging adulthood as the life stage between adolescence and mature adulthood and is characterized by unique demographic, social and subjective psychological characteristics (Arnett, 2000; Arnett, 2010). This stage of life applies to people among 19 and 26 seasons of age, during which time they gain financial independence through training and education. Previously, psychodynamic theoretician Erik Erikson pinpointed a phase of teenage individuals in industrialized communities called prolonged puberty or psychosocial suspension (Erikson, 1968). Hopwood and colleagues investigated the congenital and ecological consequences of the personality development of same-sex male and female monozygotic and fraternal twins evaluated during late adolescence (approximately 17 years), adulthood (approximately 24 years), and adult adolescence. (Approximately 29 years old) (Hopwood et al., 2011). Their genetic information research outcomes endorse a lifestyle program point of view on temperament growth through adolescents' transition to adulthood (Hochberg et al., 2020).

Emerging adulthood, also known as early adulthood, is critical for transition and life-long health protection. Despite some positive factors, the main pattern of teenage grown-ups nowadays is decreasing health care, as evidenced by healthy behaviors and related health conditions (listed below), (Committee Improving the Health, Safety and Well-Being of Young Adults, 2015), (Figure 1):



Figure 1. The pattern of young adults behaviors (Committee Improving the Health, Safety and Well-Being of Young Adults, 2015)

# The mid-adulthood stage

The term mid-adulthood is neither well defined nor well understood. The dictionary defines it as a period between youth and old age, a state of vagueness and no difference. According to one author (Cohen, 2012), the concept of middle age was invented about 150 years ago. Nevertheless, the image of middle age can

be found in the artistic expression of the life cycle as early as the 16th century. The Middle Ages were not given a special place in the artistic conception of life courses in the 13-th, 14-th, and 15-th centuries. They usually depict circular representations of the life cycle, or in some cases, linear or even seemingly random positions represent individuals of different ages (Lachman et al., 2015).

Middle age or mid-adulthood only appeared in the 20th century as an era of explanatory development in the existence trajectory (Moen & Wethington, 1999). The current longitudinal middle-aged development research is entering a new stage because, for the first time, data on actual life span development across middle-age and old age has been obtained from the critical resources of lifelong development such as brain plasticity, cognition, personality, health, and subjective representation. Related evaluations are now available (Widaman, 2008). In this case, it was evident that to understand better the development of middle age and its functional significance to the development of later years, and it is necessary to go beyond the traditional average-oriented age development norms and the assumption that middle age is regarded as a sound stage (Willis & Martin, 2005; Willis et al., 2010).

A key goal of promoting our understanding and narrowing the middleaged/mid-adulthood research gap is to create philosophical and observational designs of the development process, including the middle-aged. We use midperiod as a crucial time frame in the life course as an illustration that can mentor prospective analysis (Lachman et al., 2015). The dictionary's definition of a key is "a bridge between the young and old" (Lachman et al., 2015) "is essential in order to the evolution or accomplishment of other things, very important or critical." We regard middle age as the critical pivotal in terms of (Figure 2):



Figure 2. The characterization of the mid-adulthood stage (Lachman et al., 2015)

### The late-adulthood stage

According to lifespan development theorists, development continues into late adulthood. Well-known theorists (Carstensen et al., 2003; Charles, 2010; Erickson, 1982; Tornstam, 2005) have shown that older adults face significant challenges in later adulthood, which can be achieved by promoting their mental health and well-being. Ways to solve these challenges. In particular, in her integrated prototype of toughness and vulnerability. Charles suggested that elderly grown-ups are more likely to participate in strategies limiting negative experiences. Eriksson proposed that the developmental stages of integrity and despair occur in old age and include regrets about missed opportunities, unachieved goals, or lack of productivity (i.e., despair), or the sense of meaning, continuity, and satisfaction of life (i.e., completeness). Tornstam's Gerotranscendence theory believes that as people age, they become less selfcentered, more other-oriented, and transcend their viewpoints, Carstensen proposed in the theory of social-emotional selectivity that as people age, they will emphasize constructive objectives and speculate in partnerships and individuals systematically that provide positive emotional results (Toussaint et al., 2021).

The current generations of seniors are expected to age, maintain bodily and psychological welfare and improve the quality of their old age (Montross et al., 2006). Although the necessary drivers for successful aging are not yet fully understood, the characteristics of population aging are apparent. Accomplished maturing completes not only mean longevity or independence from disorder and impairment; it requires health, physical functioning, and mental health (Bowling & Iliffe, 2011; Musich et al., 2018). Since then, long-term prospective studies have documented the benefits of middle-aged physical activity and healthy lifestyle behaviors as reliable predictors of disease onset and disability in later life (Fries, 1980; Daviglus et al., 1998). With the development of successful aging models, more in-depth research has been conducted on the impact of mental health on physical health (Bowling & Iliffe, 2011; Musich et al., 2018).

This review aims to briefly summarize the effects and advantages of physical behavior among the adult population. Given our articles that are being published, where we have created a "whole" from a chronological point of view, where we have managed to stage the period of childhood and adolescent development chronologically, as we propose here, from the perspective of adulthood as it follows (Figure 3):



Figure 3. The adulthood development stages

# The benefits of cardiorespiratory fitness and physical activity

"All parts of the body, if used moderately and exercised in the labor that everyone is accustomed to, will become healthy, develop well, and age slowly; but if they are not used and left unused, they will be prone to illness and growth defects, and will age rapidly," Hippocrates wrote during the 5-th C, BC. However, by the 21st century, people's perception of the value of exercise for health has weakened, so that lack of exercise has now become a significant public health problem (Booth et al., 2012). Similarly, lack of exercise has been identified as the direct cause of chronic illness and death in adults (Mokdad et al., 2004; Ruegsegger & Booth, 2018).

*Physical activity or physical fitness?* —Physical fitness is a physical state of health that enables people to meet the needs of daily life or as the basis for sports performance, or both. Physical fitness components (Sopa & Pomohaci, 2021; Szabo et al., 2021) related to health statuses, such as cardiovascular health, musculoskeletal health, body composition, and metabolism, are all included in health-related physical fitness. The terms *physical behavior* and *bodily fitness* are frequently used interchangeably in a wide range of epidemiological studies, and physical fitness is often seen as a more precise (albeit incidental) indicator of bodily behavior than self-reporting (Williams, 2001; Warburton et al., 2006).

Cardiorespiratory fitness (usually measured by the maximum oxygen uptake, VO2max) is arguably the most crucial health indicator (Blair et al., 1989). In favor of, Myers et al. (2002) found that for every metabolic equivalent (1 MET) in exercise test performance, the survival rate would increase by 12%. They pointed out that "compared with other established cardiovascular disease (CVD) risk factors, the maximum oxygen uptake is a more effective predictor of male mortality. "Low cardiorespiratory fitness is also an autonomous threat element for T2D and CVD sickness and fatality (Booth et al., 2002; Kodama et al., 2009; Gupta et al., 2011)". Similarly, other researchers (Kokkinos et al., 2010) commented that males which enhanced their cardiorespiratory health from soft to supreme reduced the risk of death within eight years; On the other hand, men with high-to-low cardiorespiratory health have an increased risk of death by 50%. (Ruegsegger & Booth, 2018).

Recent studies use standardized exercise regimens to assess cardiorespiratory health. Such agreements are designed to gradually increase the workload until the maximal core frequency predicted by the participant's age is reached, or the participant cannot continue. This level of aerobic workload is called peak exercise capacity and is measured in metabolic equivalents (MET). One MET equals 3.5 mL of O2/kg/min, which is the amount of energy consumed per kilo of corpse load during one minute of rest. Any activity that requires more oxygen consumption than rest will result in higher MET levels (Kokkinos, 2010; Kokkinos, 2012). Since this exercise test is designed to exhaust participants, this health assessment method is more objective than questionnaires. The following are selected studies whose results support vocational and recreation moment research and, more importantly, enrich our understanding of the relationship between exercise or increased physical activity and health benefits (Kokkinos, 2012).

Exercise training for the elderly is correlated through health care assistance such as reduced cardiovascular mortality (Laukkanen et al., 2004). Changes in the balance of the cardiac autonomic nerves lead to an increase or relative innervation of the vagus nerve, which is an explanatory mechanism that may be involved after exercise. In addition, endurance exercise training can reduce the relaxing and sub-maximal workout core rate, systolic and diastolic bloodstream strain of the elderly, and increase thrombosis quantity (Eynon et al., 2008). This is most pronounced during maximum effort when thrombosis quantity, cardiological productivity, contractile force, and oxygen uptake increase while complete peripheral insurgency and systolic and diastolic bloodstream strain decline (Langhammer et al., 2018).

Regular physical exercise is also associated with improving mental health (for example, reducing stress, anxiety, and depression) (Warburtonet al., 2001; Dunn et al., 2001). Mental health is essential for preventing and managing cardiovascular disease, but it also impacts other chronic diseases (such as diabetes, osteoporosis, hypertension, obesity, cancer, and depression) (Warburtonet al., 2006).

**21–60** *years old.* Physical activities include leisure or leisure-time sports activities, transportation, profession (i.e., work), housework, play, games, sports, or planned exercise in everyday, group, and population behaviors.

Adults of different ages. The following activities are recommended to enhance cardio-respiratory and muscle health, skeleton health care and decrease the threat of non-communicable diseases and depression (World Health Organization, 2010; Yang, 2019) (Figure 4):



Figure 4. Physical Activities for 21–60 years old adults (World Health Organization, 2010; Yang, 2019)

*60 years old and above*. Physical activity includes physical activity during recreation or leisure time, transportation, housework, interplay, events, athletics or in daily life, family, and adults of that age community activities. The following activities are recommended to enhance cardio and muscle health, bone and functional health, as well as lowering the risk of non-communicable diseases, depression, and cognitive decline (World Health Organization, 2010; Yang, 2019) (Figure 5):



Figure 5. Physical Activities for 60 years old and above (World Health Organization, 2010; Yang, 2019)

In general, for people of all ages, the benefits of following the above recommendations and doing physical exercise outweigh the risks. Musculoskeletal injuries seem to be uncommon at the suggested degree of 150 minutes of mild-hardness activity per week. To reduce the possibility of musculoskeletal injury, in a community-founded strategy, it is appropriate to encourage a moderate start and gradually increase to a higher level of physical activity (World Health Organization, 2010; Yang, 2019).

Some researchers (Maher et al., 2013) found in two independent samples of emerging adults that emerging adults' days of participation in the *physical movement pyramid* (Figure 6) were more significant than their typical situation (i.e., interpersonal association). This model is recreated while employing instant evaluations of physical behavior (i.e., accelerometer) (Maher et al., 2014). Even though this relationship has not been studied in-depth, later adulthood, it seems that the inherent process of linking daily changes in life satisfaction with physical activity seems to be applicable through maturity since the rejuvenating consequence of sharp physical behavior might assist stimulate goal pursuit and life satisfaction Degree, has nothing to do with age (Puetz et al., 2006; Maher et al., 2015).



**Figure 6.** Adult physical activity pyramid (https://theworldbook.org/physical-activity/)

Conclusive scientific evidence from a wide range of well-developed studies shows that, compared with inactive adults, physically active adults 60 years of age and older have a higher level of cardiorespiratory fitness and have a lower risk of a variety of disabling diseases. Chronic non-communicable diseases are also lower (World Health Organization, 2010).

### Conclusions

Finally, this review harmonizes the relationship between physical activity, cardiorespiratory health, and adulthood throughout the life cycle. Changes in daily physical activity have a significant impact on overall health and well-being in adulthood. As age-related decline affects people's physical and mental health, regular physical activity is becoming more and more important for well-being.

One of the secondary conclusions from this review is that physical activity has consistent and robust effects on the brain, which mediate improvements in cognitive performance at various stages of adulthood.

The equilibrium and advancement of communities depend on the collective performance of any group of young people. Of course, this is true for every group of youngsters and youths, but the switchover to maturity marks the end of the trial period and the commencement of some meaningful action. Young people's successful transition to independent and healthy adulthood, entry into the workforce, sustained productivity, and successful parenting can contribute to the security and well-being of the country.

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