

Review article

The Concept of Successful Aging

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Abstract

Aging is characterized by progressive and predictable changes that include gradual, unrepaired accumulations of biochemical tissue alterations that compromise cell and tissue systems, rendering individuals to become less fit to reproduce, and survive.

The complex processes of aging are not homogenous among individuals and in various tissue systems, and are influenced by genetic, lifestyle and environmental factors.

Aging can be healthy or pathological. The Concept of successful aging is related to opportunities for continued activity and productivity that should represent an essential strategy from both social and medical perspectives.

The heterogenous deterioration of functions are initially detectable as loss of reserve capacity to restore homeostasis under stress, followed by altered functions at rest.

This article will present contemporary knowledge related to health and psychosocial parameters and undertakings that aim at achieving continued healthy lifestyle, generatively and making significant contribution by the elderly.

Keywords: Aging; lifestyle; retirement; successful aging

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Introduction

Aging is characterized by a progressive loss of coordinated cell and tissue function, a process that is manifested, at variable extents, across body organs and systems that renders individuals to become gradually less fit to reproduce and survive. Deterioration of function is heterogeneous among systems and individuals. It is initially observed as a gradual loss of reserve capacity, and the ability to restore homeostasis under stress, followed, later in life, by altered function even at rest^{1,2}.

Biological age, in contrast to chronological age, is synonymous with functional and physiological age, and it is an indicator of the general health status of individuals, their remaining healthy life span and active life expectancy.

Biological age may help in identifying individuals at risk for age-related disorders, serve as a measure of relative fitness, and predict disability in later life and mortality, independent of chronological age². People who function poorly are looked upon as being "biologically older" than their chronological age. Conversely, people who function well are deemed as "biologically younger". This concept may be best represented by construction of an index derived from biological markers (called biomarkers of aging)¹.

Different researchers have developed several types of biomarkers. But because different tissues and organs age at different rates, there is a need to obtain different biomarkers for different body systems.

Some of the newly developed biomarkers include:

- Changes in telomere length
- Cross-linking of collagen
- Glycosylation and glycooxidation
- Pulse wave velocity
- Sarcopenia (changes in muscles)
- Inflammatory markers
- Clotting markers
- Immune function markers

Such biomarkers may be looked upon as only predictors of more relevant regulatory mechanisms and systems, which need time and effort to elucidate¹. Moreover, most biomarkers are under substantial genetic influence, which strengthens the concept that longevity is heritable. This concept does not negate the importance of environmental influences.

The development of biological age estimates, using a combination of reliable biomarkers, together with the search for genes which contribute to aging, will benefit in extending a healthy life span, and maintaining well-being, both physical

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and psychological.

Although the basic mechanisms under-lying aging processes are unknown, available evidence is consistent with accumulation of a variety of biochemical alterations that impair functions of nucleic acids, proteins and lipid membranes.

These alterations probably include, but are not limited to:

- Oxidation by free radicals³.
- Non-enzymatic glycosylation⁴.
- Epigenetic changes, such as DNA methylation and histone acetylation⁵.

The extent to which differentiated cells are affected by aging determines physiologic function, while the extent to which stem and precursor cells (the reserve cells) are affected determines the capacity to replace and repair damaged cells and tissues⁶.

In studying of changes in older people, it is important to distinguish between effects of aging per se, and those caused by age-related illnesses. A twin study found that genetics accounted for about 25% of the variation in longevity among twins, and environmental factors accounted for about 50%⁷. However, with greater longevity (to age 90 or 100 years), genetic influences become more important.

Age-associated body system changes

Age impacts widespread changes, involve various body tissues and systems, at variable rates⁸⁻¹³. Despite all these changes, elderly individuals may significantly expand their productive life at home, in society and the workplace, by engaging in social, physical and cognitive activities. In healthy older volunteers, cognitive training can lead to increases in brain grey matter volume in the “exercised” areas¹⁴.

Lifestyle and behavioral measures, with specific carefully designed, age oriented medical care and specific devices wherever needed, are instrumental to achieve successful aging. Remaining active physically, cognitively, and socially, with continued generativity and making a contribution, are the main parameters of successful aging^{2,15}. Remaining active has specific health benefits, both in the physical and cognitive domains. There is evidence to support the old saying “use it or lose it”: to live longer and also healthier.

There is abundance of evidence suggesting that mental health diverges from physical health, in that coping, adaptation and resilience functions are surprisingly well preserved throughout most of the human life span¹⁶. This important aspect of aging has very significant implications in the

various roles that older people can perform in various aspects of their societies. Their input could be extremely fruitful in many areas that need cognitive capability. The physical aging should not bar them from providing this crucial input. This may add to the various shortcomings and fallacies of the arbitrary retirement age of 65 years.

Being able to make a contribution has been described as an essential element of “successful aging”. It has been reported that women who participated in voluntary work or activity had greater longevity than those who did not. Moreover, this voluntary work is essential to psychological well-being in late life. Physical and cognitive activity, along with social engagement, are related to improved health and function with aging. In addition to the generativity and contributions, elderly individuals can ensure their legacy through defining one’s life contributions and achievements. Staying cognitively active helps to protect memory in older people. Regular physical activity, both of moderate and high intensity, are associated with lower frequency of heart disease, diabetes mellitus, maintenance of proper weight, more beneficial levels of cardiovascular disease risk factors, and lower likelihood of disability and dependence. Much has been learned recently regarding the adaptability of various biological systems by exercise¹⁷. Regular exercise is effective to reduce or prevent a number of functional declines associated with aging, and contributes to an increase in healthy life expectancy.

Additional benefits include:

- Improved bone health with reduction in risk of fractures.
- Improved postural stability, with reduction in falls.
- Increased coordination, flexibility and range of motion.
- Psychological benefits: related to preserved cognitive function and alleviation of depression.
- Improved concept of personal control and self-efficacy, in-dependent lifestyle, functional capacity and quality of life.

A good number of clinical studies showed significant benefits of exercise and community involvement^{18,19}.

Those who live longer lives, and are vibrant until shortly before death, may provide the best possible example of successful aging. From the psychological domain, aging is seen as a life-long

adaptive process, an ongoing dynamic of selective optimization with compensation, involving the following three elements, which provide a general framework for understanding the developmental changes and resilience across the life span¹⁷.

1. Selection: as a result of physical and cognitive limitations, individuals select, or optimize, their efforts into areas of high priority.
2. Optimization: individuals continue to engage in behaviors that enrich and augment their physical and mental reserves.
3. Compensation: individuals compensate by using psychological and technological strategies.

Psychological strategies may involve using external memory aids. Technological strategies may include a hearing aid. The three elements interplay with one another so that a person may suffer from a reduction in general capacity and losses in specific functions, but creates a transformed and effective life, and thereby the older person maximizes and attains positive or desired outcomes, and minimizes or avoids negative or undesired ones.

The role of society/state

It may be very difficult for old individuals to get involved in activities that produce successful aging. It is hard to accomplish in a retirement setting or in isolation. In most countries, very few efforts are made to open organized avenues for old people to play meaningful roles as they age².

The experiences, abilities and time of older adults are largely not harnessed, and most efforts are limited to the variable needs of the elderly, without making use of their contributions to their societies. Some workers in this area describe the older generations as the only increasing natural resource, but the least used one!².

In the post retirement years, more than half of people aged 65 and older are without significant disabilities, although 80% of them have one or more chronic disease².

Such chronic diseases are usually managed successfully, and most affected people lead near normal life. Most of them are, however, marginalized from productivity, while having plenty of time and experience.

The family, society and the state need to develop modalities, policies, strategies and legislations to achieve this, in active efforts towards maximizing productive and healthy years of life, side by side with minimizing the number of years of late life

lived sick and disabled. Such modalities also help to decrease costs.

It is the duty of society to create widely accessible opportunities for older adults to remain active and productive.

Positive social support, and social activity of the older adults have been related to improving their health, functioning and happiness.

A prominent example of opportunities for older people to accomplish is the field of children education².

In most societies there is a two way deficiency of time and attention provided by working parents, as well as by the school systems to provide various types of care to the young generation. This deficiency includes teaching and education, as well as areas of culture and general knowledge. With their wide knowledge and experiences, together with their valuable support, advice and helping hand, both at home and school levels, the older generation can provide valuable contributions and role models. In addition, it provides them with the joy of giving and happiness of more achievements. Programs must be designed that are attractive and convenient to old people, to maximize their effectiveness and contributions, as long as possible. This educational model could be conveniently and actively extended to include other areas of health, environment, social and charitable work to serve and support their communities.

Concluding Remarks

In the post retirement years, more than half of subjects aged 65 and older, lead healthy lives, with no significant disabilities, although the majority have one or more successfully managed chronic illnesses. However, most of them are marginalized from productivity.

The prevailing approach, by society and medical professionals, is limited to addressing only some of the variable needs of the elderly, without making proper use of their contributions in their post-retirement years.

The family, society and medical professionals have an obligation to develop modalities to achieve the concept of "successful aging" towards maximizing productive and healthy years of the older subjects, with minimizing the years of illness and disability. Healthy and competent older people, with their knowledge experiences and wisdom, may have significant and constructive roles to play in their societies.

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