Medical Horizons

Aging: How Can We Make it Successful?

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In most western societies, nearly a fifth of the population is older than 65 years, and people will be living the third part of their lives after retirement.

In the so-called third world populations, including most Arab and Muslim countries, the picture could be somewhat different, but the medical, social and ethical implications are expected to be identical in all human societies.
Very few efforts were made to open organized avenues for old people to play meaningful roles as they age.

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!

In most countries, the retirement age is considered 65 years and above. This is an arbitrary estimation, not supported by evidence. In the post retirement years, more than half of people at the age of 65 and older are without significant disabilities, although 80% of them have one or more chronic disease. 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.

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Aging: what doest it mean?

It is known that chronological age fails to provide an accurate indicator of the aging process. Human aging is a complex and irreversible process, which is manifested at different rates in different individuals. The aging process is genetically determined, and influenced by environment.

The concept of (biological age) was introduced by many workers in gerontology. Biological 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 age.

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".

Biology of aging

From the physiological view, human aging is characterized by progressive constriction of the homeostatic reserve of every organ system.

This decline of the body is an evident on that by the third decade of life, and is gradual and progressive. There is variability in the rate and extent of decline, which occurs independently of other organ systems, and is influenced by life style, environment, personal habits, diet, as well as genetic factors.

Alterations of aging include oxidation of proteins and tissues by free radicals, non enzymatic glycoxidation, and epigenic changes such as DNA methylation and histone acetylation. The extent to which differentiated cells are affected by aging determines physiological function, while the extent to which stem cells are affected determines the capacity to replace damaged cells and repair tissues. The accumulation of altered, unrepaired proteins and tissue, seems to start early in life, probably in the late twenties or early thirties.

Individuals become gradually less fit to repair, reproduce and survive. At first, this deterioration of function is detectable in the form of loss of reserve capacity and ability to repair and restore homeostasis under stress. Later on, altered function at rest sets in. Multiple organs and systems manifest variable changes in a heterogeneous manner among various systems.

These biological changes are more clear than the mechanisms that mediate them! Such basic mechanisms underlying aging are largely unknown.

At this current level of knowledge, there are many inconsistencies between clinical and genetic studies, to explain the aging processes. There is general agreement that both genetic and environmental variables, have variable roles. Chronic, sub-clinical inflammatory processes are believed to be under genetic control, and it is detrimental for longevity.

The other concept of oxidative stress has causative links with the pro-inflammatory status.

As people age, a gradual and steady state of tissue oxidation, glycoselation, Advanced Glycation End products (AGE^S) formation, and other age related processes result in persistent derangement of proteins, including those in cell membranes, receptors and mitochondria. Natural immunity systems are variably affected.

As a result of the interplay of chronic inflammation and oxidative stresses, various vital processes undergo profound dysfunction during the aging process. It is very likely that an important link exists between the free radicals of oxidative stress and the inflammatory processes.

Derangements of lipid metabolism in old age are major risk factors in the inflammatory process. Accumulation of fat inside muscles in old age is looked upon as a deleterious factor, in various aspects, similar to that of visceral fat.

Some professionals look upon aging as an ultimate failure in the medical model founded on the idea of curing disease.

To others, aging is considered a normal part of the life cycle. There is an ongoing controversy around the concept of whether humans are programmed to die. There is some scientific understanding of the aging process indicating that, instead of being programmed to die, we age because gradually we accumulate a host of faults in the cells and tissues of our body. A large number of maintenance and repair systems collectively provide the network of cellular defense mechanisms. The weak links of this network may predispose to age-related disorders, such as cardiovascular disease, diabetes mellitus, degenerative disorders, mutations leading to malignancies and other disorders. Death finally sets it because of such disorders, rather than from old age *per se*.

The aging process is characterized by its unpredictability at the individual level. Aging can be healthy or pathological.

Supporters of this view consider aging to be not a disease, but another stage of life with its own challenges and satisfactions.

Genes, in their view, account for only a quarter of what determines length of life. Other factors, such as life style, nutrition and environment account for majority of an individual's exposure to damage and capacity for repair.

If this view is accepted, we could find explanation to prolonged longevity of many centenarians encountered in many societies. This also could explain the examples cited in religious history of mankind such as the longevity of Prophet Noah (a.s).

On the other hand, and citing religious literature, there are several lines of evidence indicating that we are destined to die. Whether this destination (ajal) implies that we are programmed to die is a philosophical concept or not.

Aging and mental health

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 span. 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.

As people proceed from being merely old by current recognized standards, to extreme senescence and frailty, mental health gradually deteriorates at variable and unpredictable pace.

The cognitive derangements that are most frequently encountered in clinical practice are: memory, attention, executive functions, and speed at which information is processed.

The most severe and insidious, as well as the first to appear, are problems affecting memory.

The most frequently encountered clinical problems of cognition as people age are depressive disorders, personality changes and dementia.

Frailty

This is an advanced stage in the process of aging, which needs special care in management.

Its presence is often subtle or asymptomatic. It is evident over time through an excess vulnerability to various stressors, with reduced ability to maintain or regain homeostasis following any destabilizing event.

The term "frail" has varied clinically relevant meanings, including: muscle weakness, bone fragility, very low body mass index, susceptibility to falling, vulnerability to infection and high risk for delirium, depression and dementia.

The term usually describes a condition in which a critical number of these specific impairments occur in parallel, individually or in various combinations.

This stage of elderly life necessitates different approach by the medical professionals, family members, and society at large.

One of the aims of care is to delay this stage as long as possible, by maximizing the healthy and productive years lived successfully in later life. But once this stage finally sets in, the real compassion, help and kind loving care are needed, from family members in particular and society in general.

The Concept: Successful Aging

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. The family and society (local or the wider one) need to develop modalities 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.

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 exercise.

Regular exercise is effective to reduce or prevent a number of functional declines associated with aging, and contribute 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, independent life style, functional capacity and quality of life.

A good number of clinical studies showed significant benefits of exercise and community involvement. Those who live long lives, and are vibrant until shortly before death, may provide the best possible example of successful aging.

On the other hand, 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 improve their health, functioning and happiness.

A prominent example of opportunities for older people to accomplish is the field of children education. 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 a valuable contributions and role model.

Their mature experienced human power could fulfill this role through nurchering and enriching the roles of paid teachers-educators, without displacing them. They could provide an image for a positive successful aging whereby the older retired individuals are looked upon to leave their legacy, after completing their own role in fulfilling their duties, and their own child rearing responsibilities. In addition, it provides them with the joy of giving and happiness of more achievements.

Programs must be designed to be 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 areas of health, environment, social and charitable work to serve and support their communities. Nothing wrong in extending sorts of incentives to older volunteers, which could be material, symbolic or honorary.

Aging and our culture

In our Arab-Islamic culture, there is a wealth of references addressing the aging issue. Whether old age is accompanied with frailty or not, there are special moral and religious considerations of care, respect and dignity entitled to the elderly.

Islam places a duty on every individual to seek healthy lifestyle, and to seek remedy from ailments. Moreover, healthy and competent old people, with their knowledge, experiences and wisdom, have significant roles to play in their society.

There is a wealth of references that elderly people who stay cognitively active, including recitation and memorizing of Al- Qura'n, will enjoy preservation of cognitive power, and largely avoid dementia or delirium.

Selected Readings

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