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Ethical Implications of Bio-Psycho-Social Transformations Entailed by the Aging Process

Ilinca UNTU[1], Roxana CHIRITA[2], Diana BULGARU-ILIESCU[3],
Bogdan DANIEL CHIRILA[4], Anamaria CIUBARA[5], Stefan Lucian BURLEA[6]

Abstract

This paper aims at making a review of the latest works concerning the topic of aging, particularizing the specificities of the aging process of the neuropsychological functions and their causes, with a view on the social and ethical implications of the psycho-cognitive deterioration entailed by aging and the possible means of intervention for primary, secondary and tertiary prevention of pathological mental aging. Our goal is to lay the groundwork for future studies that are to elaborate well-defined guides of the aging phenomenon under all its forms and at all levels it affects.

Keywords: pathological aging, theories of aging, dementia, cognitive reserve, capacity, cognitive training

[1] University of Medicine and Pharmacy „Grigore T. Popa", Department of Psychiatry, Iasi, ROMANIA. E-mail: ilinca_tzutzu@yahoo.com

[2] University of Medicine and Pharmacy „Grigore T. Popa", Department of Psychiatry Iasi, ROMANIA. E-mail: d.stigma@gmail.com

[3] University of Medicine and Pharmacy „Grigore T. Popa", Department of Forensic Medicine, Iasi, ROMANIA. E-mail: bulgarudiana@yahoo.com

[4] University of Medicine and Pharmacy „Grigore T. Popa", Department of Psychiatry, Iasi, ROMANIA. E-mail: c_bogdan_d@yahoo.com

[5] University of Medicine and Pharmacy „Grigore T. Popa", Department of Psychiatry, Iasi, ROMANIA. E-mail: anamburlea@yahoo.com. (corresponding author)

[6] University of Medicine and Pharmacy „Grigore T. Popa", Department of Anesthesilogy, Iasi, ROMANIA. E-mail: lucianburlea@yahoo.com

Introduction

Considering that population aging is an ever more stringent phenomenon, at both global and strictly national level, entailing a series of multidimensional issues, this paper aims at making a review of the field literature on the causes of the aging process, the potential means of preventing or slowing down the neuro-psycho-degenerative processes that could be implemented as intervention means, as well as on the ethical implications of the approach to elderly concerning their self-care, self-conducting, self-management and decision-making capacities when making legal decisions or choose various therapeutic interventions necessary to them.

Epidemiologic elements of normal and pathological aging

At world level, the population aging process began in mid-20th century, having a deep economic, political and social impact. The first aspect to discuss is how to prioritize and promote the well-being of the elderly. Population aging process is based on the rapid growth of the elderly percentage, caused on the one hand by the high birth rates recorded at the beginning and the middle of the 20th century and on the other hand by the increased life expectancy, which favours survival at old ages. The elderly counted 841 million people in 2013, four times more than in 1950. This number is expected to triple by 2050. Hence, the percentage of people aged over 60 was 12% in the 50s, 23% in 2013 and it is expected to reach 32% by 2050, with more or less significant variations depending on the standard of living in various regions of the world. A functional definition states that a young old person is aged 60/65-75, a middle old person 75-85 and a very old person over 85 (Atti *et al.*, 2010).

Physiological/ normal aging represents the result of a natural maturing process, while pathological aging is caused by factors such as brain disease or cerebral trauma. Hence, if a deteriorating aspect is not ascribed to a well-defined pathology, then aging ranges within normal parameters, while the existence of a triggering element makes aging pathological. Though gerontology uses the concept of pathological or abnormal aging when there are variations from normality, a clear differentiation between normal and pathological aging remains a challenge. One of the best-known and severe forms of pathological aging is dementia, materialized by global psycho-cognitive deterioration and a significant and rapid alteration of the patient's general functionality. The world economic impact of dementia is overwhelming, being estimated to 604 billion dollars in 2010. In the absence of effective primary and secondary prevention means, costs are expected to double by 2030. At the same time, both physiological and pathological aging entail a series of mental transformations, which often raise ethical issues regarding

the multidisciplinary approach to this population group (World Population Aging, 2013).

Theories on aging process

Aging is a dynamic process to which the central nervous system subjected, based on the axonal reconnection neuroplasticity and on a limited regeneration and repair capacity of the central nervous system. Although lost cells are not replaced, they are taken over by reserve neurons, through a mechanism of biochemical compensation on pre-synaptic and post-synaptic level. In aging-related neurodegenerative diseases, the dopaminergic neuron mass decreases considerably, dependent on trophic support (brain derived neurotrophic factor and glial cell derived neurotrophic factor) (Del Arco, 2011).

Contemporary biological theories on the aging process are grouped into two main categories: programmed theories and error theories. The first posits that aging follows a biological course that continues the process of growth, development and maturing. This process depends on alterations in the expression of genes responsible for maintenance, repair and defence systems. Hence, it features three fundamental components: programmed longevity, endocrine theory and immunological theory (Whitney, 2009). The first launches the concept of aging, as a result of the sequential switch of activating and inactivating certain genes, until age-related deficits become manifest. On the other hand, endocrine theory posits that biological clocks are hormonally modulated concerning the temporization of the aging process, while immunological theory states that the immune system has a programmed decline over time, with increasing vulnerability towards infectious agents (Song, 2009). A well-documented element is that the immune system reaches its efficacy peak in puberty, and that it decreases gradually. Hence, the aging process is associated with marked decrease of antibody efficiency, the pathogenic agents being harder to combat, which leads to cell stress and even death. Disorders related to immune response are correlated with cardiovascular conditions, with inflammatory processes, with oncogenesis and, not least, with Alzheimer's disease (Jin, 2010).

Error theories underline the fundamental role of the exogenous attack upon human body, which leads to the creation of cumulative prejudices on various levels, thus causing aging. They include wear and tear theory, rate of living theory, cross-linking theory, free radicals theory and somatic DNA damage theory (Miron *et al.*, 2014). The first refers to the fact that cells and tissues have vital parts that wear and tear, thus leading to aging. The second theory is based on the idea that the rate of basal oxygen metabolism is inversely proportional with the duration of life and with the aging process. Cross- linking theory posits that the accumulation of certain proteins alters cells and tissues, which results in aging.

Free radicals theory underscores that superoxide and the other reactive species of oxygen determine damage on the level of cell macromolecular components, which gradually leads to organic dysfunctions and to its shutdown; eventually, to the shutdown of the entire body (Reichman, Fiocco & Rose, 2010). Macromolecules such as nucleic acids, lipids, carbohydrates and proteins are prone to the attack of free radicals. Somatic DNA damage theory refers to the fact that DNA alteration is continual in every cell of our body. While some of the alterations are repaired, others accumulate gradually because repairing factors do not act as rapidly as damaging factors. Gene mutations have a cumulative character because of aging, leading to cell deterioration and dysfunction. Hence, the aging process can be caused by the alteration of gene integrity of the body cells (Jin, 2010).

Deterioration and its relationship with the notion of cognitive reserve

A series of neuropsychiatric conditions affect mainly the elderly; one of the most common ones is Alzheimer's disease, usually diagnosed after the age of 65. Dementia is an acquired and persistent syndrome that impairs the mnesic function and the global cognitive capacities, which leads to decrease or even loss of functions (Atti, 2010). The most frequent cause of dementia is Alzheimer's disease: 50-75% of all cases. However, a series of studies conducted post-mortem have demonstrated that many of these cases actually represent dementias of mixed aetiology, being usually a mixture of elements specific to Alzheimer's disease and of vascular elements. In early stages, its most common symptom is a significant decrease in the capacity to acquire new information, based on the impairment of mnesic function. Recent studies have reported that neuronal stem cells within adult brain hippocampus are involved in memory functioning. Their number drops considerably with age, but the underlying mechanism is still a topic to debate. The theory of telomeres has proved that they shorten by each successive cell division. When telomeres drop to a critical length, cells do not replicate significantly; this leads to cell death, organic dysfunction and the exitus of the entire body. The concept of cognitive reserve refers to the maintaining of the operative capacity of the brain, despite the alteration of global functionality related to aging. Human cognitive reserve varies by genetic factors, education level, lifestyle and environmental factors. Cognitive reserve also represents the capacity of increasing the efficiency and capacity of existing neuronal pathways and of recruiting new pathways that are not specifically assigned a certain task. Individuals with higher cognitive reserve will feature cognitive processes that are more flexible, involving longer asymptomatic periods, despite potential neurovascular injury. Hence, the term cognitive reserve is essentially different from brain reserve, which refers strictly to neuronal and synaptic density. In this context, it has been proven that individuals with similar brain reserve show different manifestations following brain injury, depending on the complexity and flexibility of their cognitive

processes (that is, the cognitive reserve potential) (Sperling, Mormino & Johnson, 2014).

Cognitive deterioration and cognitive training means

In time, all individuals become subjected to a certain degree of cognitive decline; it has been proven that the deterioration of the biological background of the cognitive functions has its earliest onset in the mid-thirties. This onset includes regional reduction in brain volume, alteration of myelin integrity, cortex thinning, alteration of dopamine, serotonin and acetylcholine receptors functionality, accumulation of neurofibrillary deposits and changes in brain metabolites concentration. These misbalances determine cumulatively a series of signs and symptoms associated to aging, having in the foreground the psycho-cognitive deterioration accompanied by subsequent decrease in global functionality (Reichman, Fiocco & Rose, 2010). The cognitive decline does not affect the elderly to the same extent; its severity depends on a series of factors, such as oxidative stress, chronic inflammation, endocrine issues, endothelial function, excess weight, poor nutrition (leading to numerous deficits), lifestyle, social activity, the presence of other somatic conditions. Considering the nature of most of these elements, a series of transformations are modifiable; the proactive change of lifestyle, the positive modification of diet and cognitive training proved effective in slowing down intellectual decline and in the long-term maintaining of good overall functioning (Sperling, Mormino & Johnson, 2014).

There are two categories of approaching methods concerning cognitive training: compensating and restorative. Compensating training concerns acquiring new ways of accomplishing diverse cognitive tasks, practically, it refers to categorising and visualizing information to be stored, as well as to using external helpful elements, such as notes or calendars. Restorative methods concern the consolidation of specific cognitive fields, with the purpose of improving functional performance. A series of more recent studies have demonstrated the importance and benefit of non-traditional pro-cognitive activities, such as social networks, recreational activities, exercising, and other integrated activities. The benefit of conducting multidimensional activities involving creativity and skill development is obvious (Stine-Morrow, 2008).

Impact of aging-related psycho-cognitive deterioration on global functioning

Cognitive decline – just like depressive symptomatology – plays a fundamental role in the functional disability of the elderly; a major issue related to functional aging is the relationship between active life and the period spent in debilitating, pathological conditions. In this sense, the concepts of active life expectancy and non-debilitating life expectancy are to be underscored (Bulgaru- Iliescu *et al.*, 2013).

Specialists within the field of geriatric psychiatry are forced to deal with numerous and significant ethical and medical challenges while treating old patients with psychiatric conditions (with or without dementia).

Normal aging is accompanied by the onset of numerous somatic pathologies. Mental diseases are common at this age, diagnosing them being often a challenge. Dementia involves intellectual impairment, the decline being progressive. Old people – especially those with many associated pathologies – are considered to be non-contributors; they depend on the socio-familial support systems and they are prone to social marginalization. Multiple losses inherent to the life of the elderly – such as the death of family members and friends, health decline, loss of status and roles or a change in roles, loss of independence, of home safety, lower standard of living – lead to lower quality of life and to the accentuation of psychiatric disturbances among the elderly (Fjell, 2010). Loss is a predominant theme and reactive depression represents a frequent response to it, manifested by lack of appetite, sleep disturbances, decreased interest for usually pleasant activities, anhedonia, flat affect, sense of uselessness, memory and cognition deterioration. Actually, cognition deterioration requires a rigorous assessment and a clear differential diagnostic, compared to dementia (Cohen, 2006).

Society is interested in maintaining optimal autonomy and quality of life among the elderly, and in preventing any kind of abuse toward these persons (possible because of cognitive decline). Discernment is assessed through an expertise conducted by a medical and legal psychiatric committee, following a clinical psychiatric and psychological examination. In the end, the committee decides whether the person in question is or not competent or benefits from discernment (a psychiatric or neurological condition leads to lack of discernment). Such an incompetent person is unable to understand, appraise or decide on daily matters (Sprehe, 2003).

Ethical implications of normal/pathological aging process

Discernment, responsibility and competence become fundamental in the management of old persons with mental conditions; their consent has to be valid, informed and non-coercive when concerning issues such as accepting medication, determining the tutorship, guardianship, determining the reliability of the will, suspending driver's license, or other situations pertaining to family civil code or even to criminal code. Things become complicated when these patients have nobody to look after them or when there are conflicts of interests with the caregivers (Rosner, 2003).

Older patients – with or without dementia – may or may not be able to represent their own interests or to manage their own lives. Competence represents the capacity of performing tasks specific to the management of daily activities and of money, of understanding the nature and consequences of their acts, of decision-making. Competence is a juridical term which means to have enough resources (capacity, ability and authority), while discernment represents a functional term related to the individual's capacity of making decisions and of performing certain acts, of understanding the nature and consequences of their acts (Stoppe, 2008). Medical and legal psychiatric expertise determines whether the patient is competent or non-competent. Standards regarding the general competence of the elderly promote, as defining elements of discernment, awareness of their own life situations, space and time orientation and self-orientation, capacity of understanding the consequences of their acts, memory, judgment capacity, intellectual function decline, potential emotional disturbances accompanying the aging process and overall functionality (Georges, 2005).

When the discernment and competence of psychiatric patients are abolished or reduced in the context of psychiatric pathology, the elderly usually suffering from psycho-cognitive deterioration, tutorship or guardianship is required to ensure the individual rights of these patients. A third person, acting as a tutor, makes important decisions on behalf or in the interest of the patient. When applicable, the instructions given by the patient before symptomatic cognitive deterioration and before becoming non-competent will be observed (concerning their treatment and care in terminal stages) (Oprea *et al.*, 2013). Through such a document, patients with dementia can exercise their right to self-determination (Cohen, 2004).

Medical and legal psycho-geriatric examination involves a routine clinical, psychological and paraclinical evaluation, in cases where cognitive deterioration is suspected (mostly dementias, pseudo-dementias, delirium, sudden onset diseases and progressive deterioration diseases, fluctuating states of confusions, focal deficiencies) (Bulgaru-Iliescu, Costea, Enache, Oprea, Gheorghiu, Astărăstoae, 2013). Old age and eccentric or violent behaviour does not automatically mean lack of discernment. Mental aspects specific to the elderly include reticence

toward financial issues and family relationships, strong religious or political beliefs, denial of death, fear of abandonment, hypochondriac ideas (that worsen pre-existing somatic symptoms) and the desire to be approved. The medical and legal psycho-geriatric examination must comprise a rigorous evaluation of cognitive function and of global orientation and functionality using specific scales (Georges, 2005).

The main ethical dilemmas in dementia refer to the decision of reducing the therapeutic program with expensive drugs, the decision of transferring the patient to a specialized facility, confidentiality clauses, psychiatric treatment and social control rules (from patients' rights to social needs versus human rights, to legal and ethical regulations in medicine, palliative treatments and care) (Bulgaru-Iliescu *et al.*, 2013).

Geriatric judicial psychiatry does not exist as independent specialization anywhere in the world yet, because it is considered that only a few old persons commit criminal acts; the only attitude requested is to pay more attention to the elderly, mostly to their needs in terms of mental health. Healthcare standards need improving, especially those regarding basic needs and the quality of life. Low socio-economic level and the social awareness of aging (especially pathological aging) influence the quality of life and the rehabilitation of older patients, as well as the prevalence of mental diseases at this age (Gestenbrand, Struhal, Baumgartner, Raynoschek, 2005). The psychiatric examiner often oscillates between legal and ethical accuracy: absence of disease does not mean good health. Family code defines total guardianship and its conditions following an evaluation by a medical and legal psychiatric committee that sets the diagnosis of a mental condition or of a disability and that determines whether the person is incapacitated or not (Rosner, 2003).

The application of criminal code in the elderly who committed a criminal offence refers to their competence when the act was committed, to the competence of procedure and power of understanding and to the competence of standing as a witness. The implication of the geriatric psychiatrist in the treatment, care and evaluation of felons with mental illnesses and the implication of psychiatrists in the ethical issues raised represent fundamental dilemmas of psychiatrists and geriatric psychiatrists (Rosner, 2003).

Conclusions

It is anticipated that the world population will continue to grow older at an even faster rate, cognitive disorders in general and Alzheimer's disease in particular becoming nosological phenomena of paramount socio-economic importance. This means that more attention should be paid to prevention methods for aging-related cognitive decline and to the prevention of psycho-cognitive

deteriorating processes related to dementia with various aetiologies (especially in Alzheimer's disease and vascular causes which are most common and often interconnected). At the same time, the aging processes entailing various degrees of cognitive deterioration and decrease in mental functions involve various ethical specificities. These specificities concern the protection of the elderly from their own physical self-care incapacity, their financial interests or their decisions concerning necessary therapeutic elements. This set of complex issues raised by the aging process, especially in its pathological aspects (often dementia), underline, once more, the need to find concrete means of approaching aging as a phenomenon and each old person from a multidisciplinary perspective, in order to increase their quality of life. This paper, elaborated as a synthesis concerning the general aspects of the aging process, its ethical implications and the methods to prevent and mitigate mental deterioration, aims to represent a theoretical starting point for future research and for the creation of optimal intervention means to overcome the problems related to old age.

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