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Master's Thesis

MODERN ASPECTS OF PROVIDING MEDICAL CARE TO OLDER PEOPLE

223 Nursing

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Abstract

The significant surge of the interest in medical and social factors of aging in the recent years has been triggered by the abrupt changes in the demographic structure of human societies. According to the UN predictions, by 2025 global human population will increase threefold compared to 1950, and the number of the older people will increase sixfold. The role and the place of the older people in the societies have been determined by the United Nations Principles for Older Persons adopted by General Assembly resolution 46/91 of 16 December 1991, which have provided for autonomy, access to care, participation in social development, possibilities for personal fulfillment and maintaining dignity.

Healthcare services should be available to older people, regardless of specialization and technological sophistication, and should be provided in all healthcare institutions providing specialized, including high-tech medical care. The advanced age should not be a reason for denying any kind of medical care, including hospital admissions, and the quality of medical services provided to older patients should be consistent with the objective of maintaining a high quality of life of older people from all societal strata, regardless of their material well-being and social status.

The aim of the study was to study the modern aspects of providing medical care to older people.

Research Assignments: To investigate the specific aspects of Gerontology as a science and the major aspects of gerontological medical care. To determine the specific aspects of geriatric care provided in geriatric centers, and to study the structure of such centers. To study the operational principles of gerontology services during the COVID-19 pandemic. To explore the potential for training healthcare personnel to provide high-quality care in geriatric patients. To review and evaluate the characteristics of the factors that influence disease in the older patients. To determine the specific aspects of nutrition in older people to achieve longevity and improve the quality of life.

Practical significance. The work has defined the factors influencing the longevity and health in old age and studied the specific aspects of work with older patients in gerontology nurses. Finally, we researched the factors that influence disease in the older patients and defined the dietary patterns in the older people, which help achieve longevity and improve quality of life.

Implementation in practice. The results of the research are implemented in the work of New York Memorial Hospital, USA.

INTRODUCTION

The background of the study. The significant surge of the interest in medical and social factors of aging [1, 5, 11, 30] in the recent years has been triggered by the abrupt changes in the demographic structure of human societies [20, 38]. According to the UN predictions, by 2025 global human population will increase threefold compared to 1950, and the number of the older people will increase sixfold [4]. The role and the place of the older people in the societies have been determined by the United Nations Principles for Older Persons adopted by General Assembly resolution 46/91 of 16 December 1991, which have provided for autonomy, access to care, participation in social development, possibilities for personal fulfillment and maintaining dignity [5, 14, 19, 33].

The need for medical care in the older individuals is 50% greater than in middle-aged adults [15, 22, 23], and the need for hospitalization in the population older than 60 years is three times higher than that in the rest of the population [17, 18, 21]. In turn, medical care expenses in one patient of post-retirement age are at least three times higher than those in a productive age patient. According to the WHO experts, in the next 50 years the expenditures on treatment of the aforementioned demographics are expected to increase almost 50%. In this regard, the reform of the entire social health system will become even more important, which requires newer approaches to planning and reforms in this industry [24, 31].

Unfortunately, in many countries of the world, the existing network of geriatric institutions is insufficient, and the current economic situation does not allow the required scale of implementation of state-sponsored social programs for the older people [1, 20, 38]. Older patients are more vulnerable in everyday life [26] and much more so in difficult times, such as during the COVID-19 pandemic [2, 3, 6]. In persons of older age groups, the risk of developing serious complications and death due to coronavirus infection (COVID-19) is significantly higher than in young and middle-aged people, given an equal probability of contact with a new virus. The mortality associated with the novel coronavirus infection COVID-19 in persons 80 years of age and older is reaching 15%, while in people under 50 years of age it is less than 0.5% [3, 10].

Given the limited health resources, the issues of optimizing the organization of medico-social assistance to persons aged 60 years and over are gaining priority [34, 35], which was the basis for this study.

To ensure equal and universal access to medico-social services, a consistent and successive system needs to be created, which would combine the medico-social services for people of all ages and the programs from primordial prevention [8, 25] to palliative care [7, 32].

Healthcare services should be available to older people, regardless of specialization [1, 9, 21] and technological sophistication, and should be provided in all healthcare institutions [18, 24, 31] providing specialized, including high-tech medical care. The advanced age should not be a reason for denying any kind of medical care, including hospital admissions [18], and the quality of medical services provided to older patients [27] should be consistent with the objective of maintaining a high quality of life of older people from all societal strata, regardless of their material well-being and social status.

The aim of the study: to study the modern aspects of providing medical care to older people.

Study objectives.

1. To investigate the specific aspects of Gerontology as a science and the major aspects of gerontological medical care.
2. To determine the specific aspects of geriatric care provided in geriatric centers, and to study the structure of such centers.
3. To study the operational principles of gerontology services during the COVID-19 pandemic.
4. To explore the potential for training healthcare personnel to provide high-quality care in geriatric patients.
5. To determine the factors that influence longevity and health in the older age.
6. To investigate the specific aspects of work of a gerontology nurse and the specific aspects of work with older patients.

7. To review and evaluate the characteristics of the factors that influence disease in the older patients.

8. To determine the specific aspects of nutrition in older people to achieve longevity and improve the quality of life.

The object of research. Male and female older patients.

The subject of research. The special characteristics and the principal aspects of geriatric medical care, the factors that influence longevity and health in the older age, specific aspects of nursing work with older patients and the dietary patterns in older people.

The methods of study:

- Investigation and investigation of scientific literature;
- Assessments of the patients
- Interviewing the patients
- Obtaining the results of the study
- Statistical analysis of the study results
- Comparison and analysis of study results.

For statistical processing of the study results, Excel software was used (by Microsoft, USA).

The scientific and practical value of the study. The practical bearing of this research study is that we have studied the specific characteristics of Gerontology as a science and the main aspects of medical care in Gerontology; we have defined the characteristics of geriatric care provided in geriatric centers, and evaluated the structure of such centers. In addition to that, we have studied the operational principles of gerontology services during the COVID-19 pandemic and assessed the potential for training healthcare personnel to provide high-quality care in geriatric patients. We have defined the factors influencing the longevity and health in old age and studied the specific aspects of work with older patients in gerontology nurses. Finally, we researched the factors that influence disease in the older patients and defined the dietary patterns in the older people, which help achieve longevity and improve quality of life.

CHAPTER 1
GERONTOLOGY. THE SPECIFIC ASPECTS OF PROVIDING CARE IN
GERONTOLOGY
(REVIEW OF LITERATURE)

There has been a dramatic improvement in life expectancy of people across the globe compared to previous centuries. In early twentieth century, the average life expectancy was 35-40 years, and the 50-year-olds were considered “old people”. However, by the end of the same century the average life expectancy increased to 70-75 years [5, 11, 22]. According to the classification of age groups by the World Health Organization, the biological age of human has undergone serious changes in recent decades. Now people 25 to 44 years of age are considered young people; those 44-60 years of age are considered middle-aged people; those 60-75 years of age are considered older people; 75-90 years is considered an old (senile) age; and people 90 years and older are considered long-living persons. Many developed nations see increasing proportions of older, senile and long-living persons in their populations [20, 38].

Geriatric medical care is a specialized long-term medico-social and psychological care offered to the older and old patients [1, 24, 31] with chronic disabling disease with partial or complete loss of self-care capacity [26] in order to prolong active longevity and improve the quality of life [27] in older and old persons.

Gerontology is a science that studies the aging of the body and the accompanying processes, as well as the ways to avoid premature aging.

In the practice of gerontological centers, there are numerous diseases, which are both chronic and acute in nature. This fact requires that the healthcare team is able to provide immediate urgent aid. However, as elsewhere, the operations of gerontological centers have their own nuances and secrets of trade.

First of all, it should be emphasized that there are very few if any diseases that only affect the people over a certain age threshold. However, there is a number of diseases that are generally more common among the older demographics.

These include cardiovascular disease, respiratory disease, endocrine disorders, digestive tract problems, as well as musculoskeletal system problems, diseases of sensory organs, neurocognitive disorders, etc.

The United Nations' Madrid Plan of Action addresses the key challenge of "building a society for all ages" and encourages national governments to provide each person with a safe and dignified old age, as well as the possibilities for active involvement in societal life due to the following:

- providing for health and well-being of older people;
- creating the conditions conducive to individual development of an older person;
- adjustment and involvement of older individuals into development of the society.

Below are some of the special characteristics of geriatric care:

- organization of medical care by age-associated diseases while taking into consideration their mutual effects;
- a long-term and continuous nature of geriatric care provided to the patient in the area of residence, in the hospital setting and in the home;
- partial replacement of purely medical emergency interventions based on the extensive use of drug products and an array of medical, social and psychological components;
- close interactions between the structural units of the geriatric service with other healthcare institutions and social services organizations [1, 5, 36].

The fundamental distinction of geriatric care is the focus on the overall psychophysiological state of the patient [4, 17, 39].

Geriatric centers are being established in many countries to ensure the development and improvement of gerontological care. The operational background of such geriatric

centers provides the framework for administrative decisions in the field of health services for older patients on a city or regional scale [17, 18, 21].

The goal of geriatric care provided in geriatric Centers is to prolong active living and improve the quality of life in older and old persons. The work is based on an understanding of the need for acceptance rather than over-focusing on the effects of aging.

Using one of such centers as an example, let us consider their structure:

- Outpatient consultative departments: Treatment and Consultative Department with Clinical Algology Center, Memory Center and a day hospital;

- Medical rehabilitation department;

- Medico-social Department with the “Alert Button” dispatching control room;

- Urban audiological center;

- In-patient departments [18]:

- 1st geriatric department
- 2nd geriatric department with the following hospice beds: palliative beds, palliative oncology beds, surgical beds; Respiratory Support Center and a field service;
- 3d geriatric department with cardiological beds;
- 4th geriatric department (Trauma and Orthopedics)
- 5th geriatric department (Mental Health)
- 6th geriatric department (Urology)
- Anesthesia, Resuscitation and Intensive Care Department

- Auxiliary services:

- Clinical diagnostic laboratory
- Radiology Department
- Functional Tests Unit
- Hospital Pharmacy
- Administrative and Housekeeping Services
- Urban Organizational and Methodological Department for Geriatrics

It is very important to properly organize the work of the gerontological service during the COVID-19 pandemic [2, 3, 6, 10], since supporting older people during a pandemic concerns everyone.

The reasons for increased vulnerability of older and old individuals [26] include senile asthenia syndrome, reduced physiological reserves and general resistance and stability of bodily systems, as well as having multiple health problems.

Comprehensive efforts to prevent an older person from being exposed to the virus, namely maintaining social distancing and strict hygienic precautions, are of paramount importance.

Older people should be advised of the need for the following measures:

- Refrain from going outdoors, visiting public places and using public transportation unless absolutely necessary;
- Refrain from visits to/by relatives and friends;
- Keep in touch with relatives and friends using modern communication technology;
- When it is necessary to go outside or visit a public places, keep a distance of at least 1.5 meters, preferably more, from other people.
- Thoroughly wash hands with soap, using soap on the hands for at least 20 seconds, especially after returning from outside; use special hand sanitizers and avoid touching the face at all times;
- If symptoms appear (fever, dry cough, shortness of breath), call to request a home visit by a doctor, but do not go to the outpatient clinic/doctor's office to see a doctor;
- Contact social services for help with purchasing groceries and medications.

Organizations that employ older people are encouraged to transfer their older employees to working remotely whenever possible.

Anti-epidemic and sanitary measures should be strictly observed in all healthcare organizations providing care to older and old patients, including nursing homes [2, 3, 6, 10].

Older and old persons need social support and assistance. The forced but necessary limitations on social contacts may adversely affect the psycho-emotional [39] and functional condition of an older person.

The help by the social services and volunteers is important, but first and foremost, it must be safe. Social workers and volunteers should be aware that they essentially are potential vectors of the virus and should take all measures to prevent infecting the older person to whom they are providing care.

The relatives of older people should communicate as often as possible by phone and via the Internet. The older persons, on the other hand, should be encouraged to learn how to use modern communication technology.

During the period of rampant novel coronavirus infection, geriatricians should recommend their older and old patients to take certain fundamental measures to prevent and/or slow down the progression of senile asthenia, namely:

- While confined to their homes, continue the physical exercise aimed at improving muscle strength, endurance and balance;
- Adequate nutrition with inclusion of protein-containing foods with each meal;
- Drinking at least 1.5 liters of fluid per day (unless contraindicated by a medical condition);
- Providing for a safe home environment.

The physicians providing medical care to older and old patients should be aware that the apparent geriatric delirium could be a manifestation of coronavirus infection [1, 2, 39].

In geriatric departments and in other medical departments [18] to which older and old patients are admitted, as well as in home-based medical care, measures should be taken for prevention, early detection and management of geriatric delirium according to the principles laid out in clinical guidelines CG 613.1 “Senile asthenia”.

The pharmacological therapy in older and old patients in a setting of rampant novel coronavirus infection COVID-19 has its own distinctive features, namely:

- Continued adequate management of chronic noncommunicable diseases and geriatric syndromes in older and old patients;

- Continued therapy with angiotensin converting enzyme inhibitors or angiotensin II receptor blockers for management of hypertension and/or heart failure. To date, there is no convincing evidence that taking these drugs increases susceptibility to being infected with COVID-19 or affects the course of this disease;

- If the patient is receiving diuretics, renin-angiotensin system blockers, nonsteroidal anti-inflammatory drugs and metformin, special attention should be paid to hydration routine, since dehydration may significantly increase the risk for class-specific adverse effects of these drugs;

- There is currently no conclusive evidence to support any effect of nonsteroidal anti-inflammatory drugs on the risk of being infected with COVID-19 or on the course of the disease. The nurse should remember the limitations of using this drug class in patients of older age groups, especially those with senile asthenia.

- Apart from the available vaccines, there are currently no pharmaceuticals with proven efficacy for the prevention and treatment of novel coronavirus infection COVID-19.

Intensive care of older and old patients with complications of COVID-19 coronavirus infection. Older and old patients should receive all necessary care when managing the complications of COVID-19 coronavirus infection [2, 6]. Age is not a factor that should prevent the patient from being admitted to an intensive care unit; the actual decision should be made based on the specific clinical situation, including the assessment of geriatric status and determination of realistic therapeutic goals.

Older adults are at a higher risk of severe illness from any infection, particularly from that caused by SARS-CoV-2 coronavirus 2019 (COVID-19), and older people differ greatly in terms of their resistance to the disease. It is known that the number of deaths from this serious illness is much higher among the older adults. For example, there have been 1.78 million total cases and 29,608 deaths in Canada as of November 26, 2021 (Source: Our World in Data, <https://ourworldindata.org/coronavirus-data>). People aged

60 years and over accounted for about two-thirds of hospital admissions/ICU admissions and 94% of deaths.

During the pandemic, Canadian geriatricians argued in favor of the need to clarify and document the care goals prior to the onset of a potentially life-threatening infection, when decisions may need to be made quickly concerning hospital admission or critical hospitalization to intensive care with intubation and mechanical ventilation. Some of these professionals have contributed to the development of COVID-19 policies, highlighting the need for a personalized approach when deciding whether and how to allocate limited health resources. A unique consideration they brought to these discussions was the acknowledgement of health system's weakness and the seriousness of the situation.

In many countries, telephone hotlines and virtual advisory services have been established, but it is obvious that more needs to be done.

For example, in early March 2020, the Canadian Geriatric Society (CGS) provided guidance for older people to minimize their risk of contracting COVID-19, which included physical (or social) distancing. Although this slows down the spread of the disease, many older people still need help with daily living activities. Older patients rely on regular contact with family members or have been isolated before the social distancing started; in addition, the older people are usually less familiar with or able to use modern communication technologies. Reducing the negative effects of physical distancing has proven to be quite challenging.

When organizing emergency care in COVID-19 infection, consideration should be given to the specific challenges that arose in this area, including risk assessment, therapeutic goals, atypical manifestations, iatrogenic complications, management of neurological manifestations (such as delirium), and discharge planning, especially in difficult cases. Concomitant deterioration and stress (often exacerbated by restrictive visitation policies, sleep disorders, malnutrition, and cognitive dysfunction during hospital stays) make older people prone to post-discharge complications. Many different needs accumulate, which ultimately will need to be eliminated.

The clinical work unrelated to COVID-19 is often done mainly in the form of video or voice calls, which older people may view with distrust or have technical difficulties with. There has been a lot of internal discussion on how to effectively assess suspected cognitive impairment using these communication technologies.

A question remains unanswered: “What impact the COVID-19 pandemic will have on future geriatric practice across the globe?”. Some of the changes are already obvious. These include more decisive advocacy for the interests of older people, increased awareness of the importance of early care planning and more active patient participation in health policy development. There will also be an increased use of communication technologies.

In order to ensure the expected high quality of care for gerontological patients, it is necessary to provide healthcare personnel with adequate training [28, 29].

Healthcare trainees need more education in Gerontology in order to prepare them to care for the aging population. A comprehensive approach to this problem will help them prepare for work in an older people-friendly health system. Geriatrics provides a framework for the involvement of healthcare professionals into the following five main areas of care for older people from an interdisciplinary perspective [1, 20, 38]: Multicomplexity, Mind, Mobility, Medications, and What Matters Most.

In many countries, health systems conduct short (often half-a-day) workshops for professional trainees using the aforementioned concept of “The 5Ms of Geriatrics” in order to increase their readiness to provide care for older people as part of an interdisciplinary team.

After introductory classes on the career in Geriatrics, the course participants engage in interactive classes to learn more about the specific aspects of work as a geriatric professional [12, 13, 16, 29].

“The 5Ms Of Geriatrics” workshops for professional trainees enhance their readiness to care for older people as part of an interdisciplinary team [1, 37]. These workshops offer a highly effective model for the essential interprofessional education in geriatrics.

“The 5Ms Of Geriatrics” represent a new framework of care for older people that directly aligns with the current core competencies of the Accreditation Council for Graduate Medical Education (ACGME) in Geriatrics for Internal and Family Medicine residents. Using the system of 5Ms (Mobility, Medications, Mind, Multicomplexity, and what Matters Most to patients), health systems conduct workshops for healthcare personnel of primary healthcare in order to improve the care for older people.

An initial assessment of the outcomes of such training during the workshop showed high satisfaction and suggested that patients appreciated the study of primary healthcare tools, especially those for cognitive assessment, prognosis and deprescribing. Of the trainees that completed the workshop, 75% reported high efficiency self-assessments. Such seminars involve an innovative and effective method of teaching geriatric care for primary healthcare patients and preparing the healthcare professionals to provide care to the aging population.

It is known that after such topical workshops the trainees may:

1. Apply “The 5Ms of Geriatrics” concept (Mobility, Medications, Mind, Multicomplexity, and what Matters Most to patients) when providing care to older persons.
2. List the five modifiable fall risk factors that can be addressed by an interprofessional fall risk management plan (Mobility).
3. Apply the five-step deprescribing plan in order to determine the drugs that are potentially unsuitable for older people (Medications).
4. List the warning signs of dementia and the components of diagnostic testing of cognitive impairment (Mind).
5. Demonstrate the use of an evidence-based and patient-oriented structure for development of cancer screening recommendations for older patients with complicated health parameters in order to improve treatment cohesion with the goals and the prognosis [1].

Since older people across the globe are living longer and relatively healthier lives, it is very important for health professionals to acquire the skills that will help their patients

develop as they age. The institute of Medicine is committed to improving the geriatric competence of all staff to achieve this goal. For example, the Accreditation Council for Graduate Medical Education (ACGME) defines 26 geriatric competencies for family medicine and internal medicine residents [13, 37]. This is such a unique opportunity to train physicians to meet the care needs of an aging population. Since resident physicians have traditionally received varying degrees of training in geriatrics contrary to recommendations, residency programs have taken steps to improve education in care for the older patients since the emergence of core geriatric competencies recommended by the Accreditation Council for Graduate Medical Education (ACGME). Nevertheless, the competing factors, including the intensity of academic programs and often-insufficient clinical exposure continue to affect the training of medical specialists who are working with older patients and acquisition of important geriatric knowledge.

CHAPTER 2

THE OBJECT OF RESEARCH AND METHODS OF STUDY

In order to achieve the objective of our research study, which consists in investigation of modern aspects of providing medical care to older people, female and male older patients have been selected as the object of research.

In this research study of modern aspects of providing medical care to older people, the following scientific methods have been used:

- Investigation and investigation of scientific literature;
- Assessments of the patients
- Interviewing the patients
- Obtaining the results of the study
- Statistical analysis of the study results
- Comparison and analysis of study results.

For statistical processing of the study results, Excel software was used (by Microsoft, USA).

In order to fulfill the tasks of this research study it is necessary to study the specific aspects of nursing assessment in Gerontology.

The work of nurses with patients in a gerontological unit should include the following stages:

- Collection of information about the patient.
- Determination of patient's problems.
- Planning of nursing care.
- Implementation.
- Evaluation.

Nursing assessment in a gerontological department is quite different from the physician's assessment, since the main objective of the physician in this regard is to make a diagnosis and to identify the causes and the mechanisms behind the disease development. The objective of nursing assessment is to collect the information about the

patient. The information should be univocal, accurate and complete. Failure to collect information correctly leads to an inaccurate assessment of patient's needs and, as a result, to ineffective care. The following reasons may cause collection of inaccurate information: inexperienced nursing staff, disposition of jumping to conclusions and disorganization of the nurse's work process.

There are five main sources of information about a patient:

- Directly from the patient
- From the patient's relatives, acquaintances, friends and even fellow patients roommates (although the latter might be quite unreliable)
- From physicians, nurses and paramedics of Emergency Medical Service.
- From the patient's medical records: hospital records/charts, discharge summaries, outpatient medical records, etc.

Based on the data obtained, it is possible to reason further concerning the patient's general health, the characteristics of their disease/condition and their need for nursing care.

The information collected about the patient can be of two types: subjective and objective.

Subjective information means the data about the patient's sensations regarding health problems. These data include the patient's reports of anxiety, fear, insomnia, poor appetite, discomfort, etc.

Objective information: this means the data from professional observations, tests and measurements. Objective information includes the following: body temperature, blood pressure, pulse rate and respiratory rate. It is important that this information be collected according to existing uniform assessment protocols and industry standards.

For a complete collection of the required information, the nurse should interview the patient; study their health history, as well as history of present disease and data of diagnostic tests and procedures.

The main method of collecting subjective information used by nurses is an interview.

The interview with the patient pursues the following goals: establishing a trusting relationship with the patient, teaching the patient to manage anxiety, explaining the course of treatment to the patient, identification of patient's expectations regarding care and obtaining important information that needs a more thorough follow-up.

The objective of physical examination is to examine the systems and organs of the patient and identifying the health problems not mentioned during the conversation with the patient. The nursing assessment is substantially different from that conducted by physicians; therefore, although the techniques may appear identical (i.e. auscultation, palpation, etc.), the classic medical approaches and methodologies are not applicable to nursing assessment. In addition, the data are documented in the patient's nursing record. Physical examination begins with inspection; the next stages include palpation, auscultation and percussion. Having confident skills of palpation, auscultation and percussion is the professional task of a nurse with a higher education.

General health assessment includes several important items:

- Assessment of the patient's sensory organs
- Assessment of the patient's position and posture.
- Measurement of the patient's height and body weight.
- Assessment of the skin and mucous membranes.
- Assessment of the musculoskeletal system.
- Assessment of the cardiovascular system.
- Assessment of the gastrointestinal tract.
- Assessment of the urinary system.
- Assessment of the endocrine system.
- Assessment of the reproductive system.
- Assessment of the nervous system.

The work of the nurse when collecting the health history of the older person calls for a special approach, since the correctly collected history is suggestive of professional qualification of the healthcare worker. It should be borne in mind that vision, hearing and speech deteriorate with age; often the patients need to use glasses or hearing aids,

therefore the area where the interview is conducted should be well lit, so that the patient is able to see the face and the lip movements of the interviewer. This to some extent facilitates the understanding of the question.

The facial expression of the healthcare worker should express interest and empathy; this will help establish rapport with the patient. Questions should be spoken out clearly and at a little slower pace than usual; if necessary, the nurse may need to speak louder and repeat the question; however, under no circumstances the nurse may shout at the patient. The voice tone plays an important role in communicating with the patient; an excessively loud voice creates an atmosphere of dominance and impedes the establishment of trust-based relations. However, a quiet voice may be interpreted as suggesting a lack of confidence, and a person who speaks too softly will not inspire confidence either. It must be remembered that a dialog is only possible subject to several unbreakable rules of relationships between the older patient and the healthcare professional:

- trusting attitude towards the patient,
- perception of the patient as an equal,
- conducting the conversation on the nurse's behalf, refraining from an appeal to authority.

The ability to communicate in such a manner is an essential skill in nursing work, since such dialogs have a psychotherapeutic value, calm the older patient and provide them with a sense of control, and improve therapeutic outcomes.

CHAPTER 3

THE FACTORS THAT INFLUENCE LONGEVITY AND HEALTH IN THE OLDER AGE

As human life expectancy increases, so does the prevalence of disease. Aging is a complex multifaceted process of molecular and cellular decline, which over time effects tissue function, making the body feeble and susceptible to disease and death.

Over the past decades, the growing bulk of scientific literature in various biological models has significantly contributed to detection of conservative biological mechanisms, which prevent structural and functional deterioration in living systems with age.

Taken together, these data provide insight into healthy aging and longevity. For example, molecular genome integrity, telomere length, stability of the epigenetic landscape, and homeostasis of proteins are the features associated with a "younger" condition. These molecular signs underlie the cellular functions associated with aging, such as the adaptation of mitochondria, assimilation of nutrients, effective intercellular communication, stem cell renewal and the regenerative capacity of tissues.

As of today, caloric restriction remains the most reliable strategy to prolong health and longevity in the majority of tested biological models. Therefore, significant attention has been attracted by the longevity strategies that utilize the positive effects of caloric restriction owing to integration of metabolic signals into the aging processes, such as insulin/insulin growth factor-1, sirtuins, and mammal rapamycin target, as well as 5-adenosine monophosphate-activated protein kinase.

Therefore, low molecular weight targets of these pathways have emerged in an intensive search for calorie-limiting options, of which resveratrol, metformin and rapamycin have been studied the most extensively. The holistic understanding of the molecular and cellular mechanisms underlying the age-related destruction and regeneration, and the way these pathways are interrelated, remains a serious problem for identification of interventions directed at slowing down human aging while simultaneously extending the molecular and physiological juvenility, viability and health.

In this series of the research study, we have studied a number of factors that influence life expectancy using the results of interviews, surveys and observations in 464 older people, among which there were 252 females and 212 males of older age.

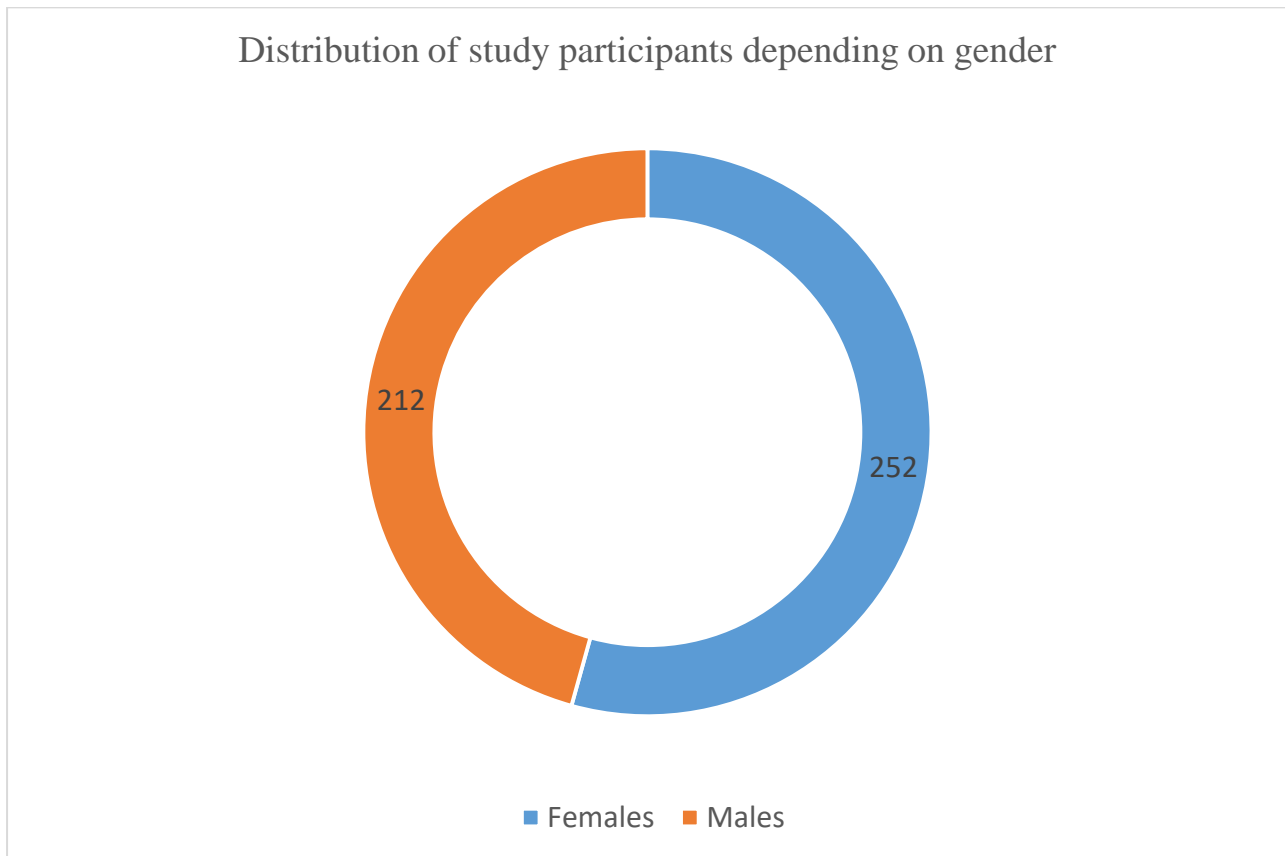


Figure 3.1. Distribution of study subjects depending on gender

First, we have considered some factors, which have been demonstrated to influence life expectancy. In particular, we have reviewed some of the factors that reduce life expectancy, such as:

- Smoking. This pernicious habit is causing up to 30% of all human cancers.
- Light pollution during sleep. It is recommended to sleep with the curtains closed, preventing the light from the street from getting into the room, or wearing a sleeping mask. This is especially important for people living at latitudes where northern summer nights are common. During northern summer nights (the so-called "white nights") people may have lower production of melatonin, a substance that is very important for longevity.

In addition to northern summer nights, as probably any urban area, cities in respective geographic regions have significant light pollution by the electric lighting, which also disrupts the diurnal rhythm of melatonin production. In people living at northernmost latitudes, especially during the season of northern summer nights and in the autumn (when daylight hours are rapidly shortened and people are living much of the day at artificial lighting), prophylactic use of melatonin 1 to 3 mg at bedtime may be recommended as controlled by the physician.

Factors that increase life expectancy:

- Moderate regular exercise. It is better to do small jogs or at least walks every day than to run 7 km once a week. A regular exercise in the morning, fitness groups: all these are good for longevity.

- Intellectually challenging tasks. That the people with high levels of intelligence live longer lives is a fact that has been established for a long time, but recent studies have obtained plenty of new data. For instance, it turned out that in Sweden the biological age of the 70-year old people born in 1906 was different from that of the 70-year old people born in 1922. The Swedish septuagenarians born in 1922 were “biologically younger”; interestingly, the 1922 generation had longer secondary school programs and were more likely to pursue higher education. The educational level seems to have a positive correlation with life expectancy. Doctors of Philosophy seem to live longer than the people with secondary education. Fellows of the Academy of Sciences seem to live longer than their colleagues who “only” have Ph. D. degrees.

What is the reason behind this? It would seem that the answer lies on the surface: well-educated people tend to earn more, and people with higher income get respectively better healthcare, eat better food and rest better. There are less smokers among educated people, they are less likely to abuse alcohol and drugs and, consequently, their lives are longer and of higher quality.

However, it has been established recently that with every new level of education there is an increase in the length of telomeres (the terminal areas of chromosomes). No

explanation has been offered for this fact so far, but this has been confirmed in several studies. And the longer the telomeres, the higher the chances to live a long life.

- Anti-aging drugs. Some drugs may indeed slow down the aging process. In part, these agents include metformin, which is regularly prescribed as a sugar-lowering drug in patients with diabetes. The scientists inquire whether such drugs may be used by healthy people in a preventive fashion, merely to prolong life. The answer is a cautious and caveat-limited "yes". A research project is being planned in the US, where up to 3,000 non-diabetic people aged over 65 years will be receiving small doses of metformin over 5–7 years. Animal studies have shown metformin to have anti-cancer effects. In 2015, a British research team published a very interesting research paper, where a study in a large number of volunteers has demonstrated metformin to prolong lives of diabetic patients (i.e. people with a serious illness) by an average of 15% even compared to diabetes-free individuals. Experiments using animal models have shown that the earlier the exposure begins, the better the effect. Caloric restriction works in a similar way: starting the restriction of calorie intake shortly after puberty is more effective than starting it at an older age.

A century and a half ago, the average life expectancy in Europe was 40-45 years; as of today, this figure has grown to 70-75 years. The research of active longevity is currently considered one of the most promising directions in biomedical science; but until now, the question of factors of longevity remains one of the most controversial issues. Scientists are trying to answer it using different theories of aging.

The scientific theories of aging are as follows:

- The proponents of the theory of genetically determined aging argue that the aging processes are primarily due to our heredity.

- The gender impact theory: there are generally more centenarians among the women. Moreover, scientists argue whether this difference is due to chromosomal chains or to the fact that men merely expose themselves to a greater risk of injury and illness.

- The geographic theory suggests that life factors in certain Blue Zones on our planet are capable of explaining remarkably large numbers of centenarians living there.

The most famous of these zones is the Japanese island of Okinawa, which ranks first in the world in terms of the number of centenarians. As of 2008, 36,276 people aged 100 and over lived on this island. Notably, health indices and mental acuity in these people were much better than in the old people living in other regions of Japan. The scientists are actively studying the "Okinawa Phenomenon"; the primary explanation is a special diet: the inhabitants of the island eat plenty of vegetables and soy products. An active lifestyle and spirituality also contribute to longevity.

- The theory of cellular aging assumes that the general waste of the body is primarily related to the processes occurring in the cells. The cellular structure is damaged by free radicals, i.e. by molecular particles with unpaired electrons on the outer shell. These particles launch oxidation processes in the cell, which lead to damage and disrupt cellular metabolism. The emergence of these aggressive particles in the body is usually associated with air pollution, ultraviolet radiation and exposure to radioactivity. Insufficient sleep, stress, alcohol and nicotine also contribute to destructive processes in the cells. As suggested by scientists, a large number of free radicals in the body not only weakens the body, but also causes the development of many chronic and acute diseases. However, the good news is that we may fight off the free radicals. Antioxidants are the chemical compounds that slow down cellular oxidation. Some of these compounds are produced endogenously in the body (i.e. enzymes and hormones), while others are obtained externally with food (i.e. vitamins). Vitamins A, C and E are some of the most powerful antioxidants. Another factor in the fight against cellular oxidation in the body is a low-calorie diet. In counteracting cellular aging, procedures with saturation of cells with oxygen in a pressure chamber produce very good effects.

The human body is a perfect mechanism, which is designed for long-term viability. However, in most cases the individual either reduces or prolongs the vital potential hardwired by nature, by taking or not caring care for their health. This may sound as a tedious truism, but strong physical health is the basis for longevity and remaining active into the advanced age. It is common knowledge that 20% of human health depends on heredity, another 20% is determined by the impact of the environment and the social

milieu, and the remaining 60% depends on lifestyle, habits and behaviors. Healthy lifestyle assumes optimal organization of life's routines and the behavioral patterns that safeguard the health of the person and of their significant others.

Living a healthy lifestyle is not difficult, but it does take some effort and compliance with certain rules (including giving up on bad habits); however, many people neglect these simple suggestions. Novel technology, the successes of medical science and modern devices are all aimed at prolonging life. However, none of them will be effective if the person does not adhere to a healthy lifestyle.

Various factors may determine the longevity of an individual. Maximum life expectancy is determined by genetic factors, by inherited predisposition and by the quality of the environment. However, the decisive role is more often than not played by the lifestyle. Early aging threatens only those who are inattentive to their health, lead unreasonable lifestyles and are reluctant to give up the already existing bad habits, such as smoking, excessive alcohol consumption and intemperance in food. Alternatively, those who are engaged in fitness programs and sports, have a balanced nutrition, take a rational approach to work-life balance and avoid psycho-emotional overload, will be able to extend a full life for many years. During analysis of the results of numerous studies on the lifestyles of centenarians, the following major significant factors that influence human life expectancy can be distinguished (Table 3.1).

Table 3.1. The factors that influence human life expectancy

Life-prolonging factors	Life-shortening factors
Exercise and sports	Sedentary lifestyle
Active lifestyle and tourism	Indifferent attitude towards life, apathy
Healthy nutrition	Overeating, unbalanced diet
Rejection of bad habits	Smoking Alcohol abuse Drug abuse
Tranquility, inner harmony	Stress, depression

Exercise and sports. One of the principal and most important components of a healthy lifestyle is exercise. Performing special exercise will help offset the often low physical activity of people living in the modern world. Regular exercise and sport activities are very important to keep the individual healthy; these components of a healthy lifestyle are shaping the physical aspects of the human person and provide a boost of moral/spiritual energy. Physical activity makes a person strong, enduring, flexible and fast. It develops dexterity and fast reaction times.

Our physical appearance has been formed through millennia by unceasing locomotory acts of varying physical challenges and coordination complexities. The intensive and physically demanding daily labor of our remote ancestors gave way to sedentary, operator-like and clerical operations. The “office-like” lifestyle is a frequent cause of various ailments and illnesses.

Physical exercise can be used not only to prevent but also to treat disease. This is the immediate objective of exercise. Owing to exercise, many people get a “second life” and get back on their feet after severe injuries. Special sets of exercises, training on exercise equipment and massage contribute to the restoration of muscle cells and fibers and eliminate muscle atrophy, which may result from both forced inactivity and from a sedentary lifestyle.

Not only human muscles need regular training, but also the blood vessels, the lungs, and the blood. In low motor activity, a part of blood may stagnate in the liver, in the spleen and in certain other organs. Only active exercise is able to recover this reserve blood back into the circulatory bed. Regular training, not necessarily long and exhausting, can make a human better adjusted and endurable. Physical exercise, sports, cold exposure training and respiratory exercise stimulate physical performance, shape and recruit bodily defenses, contribute to human adaptation to external environment, and thereby push back the timing of aging-related disease. Ultimately, they extend the duration of active human life.

Active lifestyle and tourism. Morning exercises, physical education lessons, walks along a familiar pleasant route, hiking on weekends, skiing, cycling, and even walking a dog: all these activities may have a healing effect on the human body. One of the types of active recreation that helps to improve health and increase life expectancy includes tourism.

Tourism brings regeneration of human strength using active recovery of both physical and mental condition. Tourism provides a change of perspective and brings variety to the established routine of life. Clean air and active form of recreation effectively contribute to human health. The emotional and psychological relaxation is another advantage of tourism. Favorable climate, beautiful nature and the proximity of water bodies, all these contribute to a positive psychoemotional setup. At the same time, tourist activities provide a break from the irritating factors of industrial and urban environment, such as noise, the hustle of city life and a constant stress.

Today tourism has become more accessible for the older people, for people with health problems and for people with disabilities. Such people are increasingly more frequently seen at popular scenic destinations and on tours and road trips. Tourism is becoming a part of normal lifestyle for modern people, including people with disabilities. At the same time, tourism is becoming increasingly important as a rehabilitation modality for people with health problems.

Active recreation is a factor that counteracts sedentary lifestyle, which has detrimental physical and mental health implications. Motor limitations significantly limit life opportunities and cause depression, discouragement and stress. Tourism provides the means for treatment and prevention of psychosomatic disease and for maintaining good physical shape and optimal health. Regular practice of recreational tourism has multiple beneficial effects on functioning of the body as a whole and on human life expectancy.

Healthy nutrition. A healthy diet is the foundation of a long and active life. What foods should be preferred by those willing to live long lives? The majority of researchers and dieticians agree that throughout their lifetime, humans should adhere to a balanced diet and practice temperance in eating.

In addition, the extremely important human health functions of the diet include not only its nutritional value, but also the preventive, health-improving, detoxifying and protective aspects of nutrition. This largely determines the current requirements to the composition of a balanced diet. A balanced diet always has a scientific ground, which makes it possible to meet the body's energy requirements.

Not only the quantitative, but also the qualitative characteristics of foods are to be taken into account; therefore, the main features of rational nutrition are balance and proper schedule.

A diet is considered balanced when it provides an optimal ratio of the main nutrients and biologically active substances, such as proteins, fats, carbohydrates, minerals and vitamins. If we take the energy value of the daily food intake as 100%, then 14% should come from proteins, 30% from fats and 56% from carbohydrates. Proteins and fats must be of both animal and plant origin. Useful foods include sea and ocean fish, which is rich not only in protein (complete with essential amino acids), but also in omega-3 polyunsaturated fatty acids, microelements and vitamins. Importantly, fish contains a large amount of iodine, which has a therapeutic and prophylactic effect and prevents the development of many diseases. Vegetable fats have protective properties, prevent atherosclerosis and reduce blood cholesterol levels.

Temperance in eating has been presently shown to increase life expectancy. It can be achieved by significant reductions in sweet and fatty foods, mainly confectionery and sweets, which are very high in calories.

At the same time, a healthy practice is to increase the consumption of low-fat dairy/sour milk products, bread with bran, fish, various cereals rich in fiber (which are useful for the digestive tract), as well as raw vegetables and fruits, mainly locally produced.

Reducing the caloric content of the diet to 2000 kcal per day and below leads to an improvement in many functions of the body; of course, provided that the diet is balanced and the content of vitamins and microelements is sufficient. This is confirmed when studying the nutritional patterns of centenarians from various countries of the world.

Japan ranks first in the world in terms of the relative number of centenarians per 100,000 population. At the same time, the best health indicators are in the centenarians of the southern islands, mainly in Okinawa. The diet of long-livers of Okinawa includes a lot of vegetables, sweet potatoes, soybeans and fish. Eggs in moderate amounts are used for preparation of tofu, a specialty food of fermented soybeans. Rice is an important source of calories. In the recent past, Okinawans consumed an average of 1800-1900 kcal per day; however, their diet was well balanced with all the necessary components and vitamins.

The diet and the nutritional habits of the Caucasian centenarians have also been studied well. Their main source of carbohydrates is gomi (a local variety of mamaliga), a maize flour dish. Important constituents of their diet include beans, a large amount of fruits (cherry plums, pomegranates, persimmons, and grapes), vegetables (onions, cabbage, beets, Jerusalem artichoke) and various spices. Yogurt and cheese are most often made with goat milk. The scarce amount of meat in the diet is represented by poultry, goat and lamb dishes. Vegetable oil is made from walnuts. The calorie content of the daily diet was estimated at below 2000 kcal and 1800 kcal in the older individuals.

On the contrary, intemperate eating and a calorie intake, which is high against the physiological range leads to excessive body weight and may ultimately lead to obesity.

For a healthy diet, it is important that the food contains a sufficient amount of all necessary vitamins, especially A, E, C, P, B vitamins and some others. A high content of various vitamins and microelements can be found in nuts, liver, honey, rose hips, black currants, cereal sprouts, carrots, cabbage, red peppers, lemons and milk. These foods stimulate digestion, have beneficial effects on the functions of the intestines, the gall bladder, and the pancreas.

Thus, a healthy and proper nutrition is not about rejecting all things customary and tasty, it is the optimal ratio of staple foods and main biologically active substances, while taking certain rules into account. The following principal conditions are to be remembered:

People should exercise temperance in food and avoid overeating, since even the healthiest foods may do harm when eaten in large amounts.

For example, excessive consumption of purine-rich foods such as sardines, canned fish, herring and organ meats (tongue, kidneys, liver and brain) can lead to gout. Oxalates increase the likelihood of kidney stones formation. Large amounts of oxalates are found in some vegetables, such as spinach, beets, tomatoes, beans and asparagus, kale, chicory, and leeks. Other foods rich in oxalates include chocolate, peanuts, sugar, honey and other sweets.

It is recommended to eat at the same times of the day; the dietary regime is of great importance. It is important to diversify the diet, eat green leafy vegetables and fruits. At the same time, consumption of fried foods, confectionery, sugar and salt, as well as animal fats (including butter) should be limited to a bare minimum. Those with a sweet tooth should keep in mind that excessive sugar consumption puts them at risk for type 2 diabetes. In addition, it has long been known that over-fried foods and especially reused cooking grease is one of the factors contributing to the occurrence of cancer.

Smoking. It has long been no news that tobacco smoking is one of the main factors in reducing life expectancy. Each of us may easily spot a heavy smoker, since smoking tobacco leaves an indelible mark on human appearance; the skin and the teeth suffer to a greater extent. The smoker is distinguished by a hoarse voice, puffy face, often shortness of breath. Very often, smoking leads to chronic bronchitis, which is accompanied by a constant cough and halitosis (bad breath).

The inhaled smoke not only burns mucous membranes; it also contains large amounts of harmful substances. Research has shown tobacco smoke to contain a whole range of toxic compounds, such as nicotine, carbon dioxide, carbon monoxide, hydrocyanic acid, ammonia, hydrogen cyanide, various resins, organic acids, and many carcinogenic substances such as benzene, vinyl chloride, formaldehyde, nickel, cadmium and many others.

However, even when nicotine, the “active ingredient” in tobacco smoke, is regarded as an isolated compound, it has a number of adverse effects in human body. Small doses of nicotine excite the nerve cells, causes rapid heartbeat, irregular heartbeat, nausea and vomiting. In large doses, nicotine may inhibit and even paralyze the activity of cells in the

central nervous system. External manifestations of this effect may include hand tremors, indifference, decreased ability to work and weakened memory. Nicotine also has effects in the endocrine glands.

The effects in the adrenal glands, which secrete adrenaline into the blood, leads to vascular spasm, increased blood pressure, and increased heart rate. Due to its adverse effects on reproductive system, nicotine contributes to erectile dysfunction in males.

Women are also in grave danger. Infertility is almost 9 times more frequent in smoking women (in approximately 41.5%) than among nonsmoking women, and premature menopause occurs 16 times more often than in women with healthy lifestyles. In a pregnant woman, smoking is even more detrimental, since the nicotine, being readily absorbed into the blood, poisons the child in the mother's womb. Apart from nicotine, the smoking mother may expose her fetus to the carcinogens she inhales with the tobacco smoke. Women who smoke during pregnancy are significantly more likely to experience miscarriages, stillbirths, intrauterine growth retardation, complications during childbirth and death of newborns in the first days and months of life. Children born to mothers, who have been smoking for many years, are often diagnosed with failure to thrive in the early years of life; many babies have a heightened predisposition to convulsions and epileptic seizures.

Smoking is detrimental for cardiac and vascular health. Nicotine disrupts the tone of the vascular walls, causing their damage and the formation of blood clots in the blood vessels. Smokers often complain of heartache; this may be associated with spasm of the vessels that nourish the cardiac muscle, which may result in angina pectoris. We have studied the confirmation of association of smoking with the development of various disease, including a large proportion of malignant tumors. The incidence of diseases largely depends on age, gender, age when the person started smoking, duration of smoking, the number of cigarettes smoked per day, and other factors; thus, it may vary significantly. General information can be presented in a tabulated form (Table 3.2).

Table 3.2. The incidence of various disease in smokers and non-smokers

Condition	The incidence of disease in smokers
Bronchitis and emphysema	12 times more often than in non-smokers
Aneurysm	4-8 times more often than in non-smokers
Peripheral vascular disease	6-10 times more often than in non-smokers
Stroke and myocardial infarction	3-5 times more often than in non-smokers
High blood pressure, angina pectoris	2 times more often than in non-smokers
Tuberculosis	3 times more often than in non-smokers
Pneumonia	2 times more often than in non-smokers
Gastric ulcer	4 times more often than in non-smokers
Oral cavity and pharyngeal cancer	2-3 times more often than in non-smokers
Esophageal cancer	5 times more often than in non-smokers
Stomach cancer	1.3-1.5 times more often than in non-smokers
Pancreas cancer	2-3 times more often than in non-smokers
Urinary bladder cancer	5-6 times more often than in non-smokers
Leukemia	1.5 times more often than in non-smokers

Other components of tobacco smoke also have substantial toxic effects. The substances contained in tobacco smoke damage the digestive tract, primarily the teeth and the oral mucous lining. Nicotine increases the secretion of gastric juice, which causes dull abdominal pains, nausea and vomiting. All of the above manifestations can be a sign of gastritis or gastric ulcer, the latter much more common in smokers than in non-smokers.

People who smoke regularly expose their bodies to substantial danger every day. Smokers make up approximately 95% of all patients with lung cancer. The greater the pack-year index, the higher the probability of falling prey to this serious condition. It has been proven that smokers are much more likely to have cancers of other organs, namely the esophagus, stomach, larynx and kidneys. Long-term studies have shown that smoking shortens human life span by an average of 10 years. The results are alarming; smoking-

related deaths are mainly associated with cardiovascular disease, respiratory disease and cancer.

People who smoke endanger not only themselves but also those around them. The damage due to second-hand smoke is well known for a long time. When exposed to second-hand smoke, non-smokers may have substantial levels of tobacco smoke components in their bodies as they inadvertently inhale tobacco smoke both indoors and outdoors, often in public areas. Similar to active smoking, passive smoking increases the risk of developing many serious health conditions, primarily cancer and cardiovascular disease; the likelihood of developing respiratory and digestive system disease is also increased. Longevity and smoking are strictly opposite phenomena.

Alcohol abuse and life expectancy. Alcoholism cannot be called just an “adverse social habit”; it is a terrible disease, a kind of substance abuse. It is worth mentioning that the life expectancy of a heavy drinker is reduced by about 20 years and in Ukraine does not exceed 50 years on the average.

According to the World Health Organization, alcohol is responsible for nearly 4% of all deaths worldwide.

People with this ailment have a mental and physical dependence on alcohol, i.e. an irresistible urge to drink. Alcohol abuse destroys a person's life, prevents them from adequate thinking and reasoning, increases morbidity, reduces working capacity, and causes premature aging and an increase in mortality. Drunkenness and alcoholism are the major contributors to the decline in life expectancy.

Alcohol has negative effects in human blood, inhibiting the production of platelets, as well as the production of white and red blood cells. As a result, a person who abuses alcohol is more often susceptible to various infections that can undermine health. In addition, alcohol slows down blood circulation in the vessels of the brain, causing oxygen deprivation of cerebral neurons; this may lead to a weakened memory and other serious cognitive ramifications. Early sclerotic changes develop in blood vessels; the risk of cerebral hemorrhages increases. The destruction of brain cells and degeneration of the

nervous system may become the impetus to the development of pneumonia, cardiac and renal failure, and psychosis.

A person with alcohol addiction is incapable of thinking soundly; it is as if their brain does not obey them. The people in the immediate surroundings may have a hard time realizing that this is the same person, who used to be vigorous, healthy and full of strength. A drinker is usually looking older than their age; their skin quickly loses its elasticity and ages prematurely; their face looks swollen, with baggy skin below the eyes.

Because of constant exposure of the walls of the small intestine to alcoholic beverages, these people lose the ability to fully absorb nutrients and trace nutrients; this leads to exhaustion of the alcoholic's body. An almost permanent chronic inflammation of gastric and intestinal lining increases the risk of developing a peptic ulcer several-fold. People with alcohol abuse are 10 times more likely to develop diabetes. Alcohol inhibits the functions of the pancreas and causes an overall disruption of metabolism. The liver is the organ that suffers the most from alcohol; it is the liver to neutralize approximately 95% of all toxic substances entering the body. The damaged liver develops inflammation, which is leading to hepatitis, followed by cicatricial degeneration, i.e. cirrhosis. The liver ceases to perform its crucially important function of neutralizing toxic metabolic products and the body becomes virtually defenseless.

Drug abuse and its effects on life expectancy. Drug abuse is a serious and intractable disease, which develops because of the use of narcotic drugs. Their effects in the brain lead to the formation of drug addiction, that is, a chronic, recurrent disease.

For these patients, the constant use of the drug becomes a vitally important and overwhelming need. Drug abuse leaves an indelible imprint upon all aspects of life, leading to negative ramifications for the individual's future (if a future is at all possible).

The causes of drug addiction are vastly different. They may include sociological factors (i.e. the influence of the society, the family and the milieu); the biological factors, which determine the trends toward and special physical predisposition to substance abuse, and mental factors (i.e. certain psychological factors and mental problems that make the person vulnerable).

Each person reacts to certain toxic and biological effects in their own way. Someone is sick often; another one is known for their good health; some people are able to endure heat, cold and strenuous physical loads. Different individuals respond to many other external factors in different ways. Drug addiction to that or other substance can also be very different. Being predisposed to effects of that or other psychoactive substance may trigger a strong dependency already after the first dose of the substance.

Drug abuse is affecting all spheres of human life, deteriorates all bodily systems and causes disturbances in the functioning of the body as a whole. After the dependency has developed, breakdowns in bodily functions start following one another. These include malfunctions of individual organs and entire groups of organs, impairment of memory and attention span. The person is no longer able to adequately perceive themselves and other people; cognitive deficits develop; the person loses empathy and emotional sensitivity, and finally there is a complete disintegration of the personality. Of all the diseases, only alcohol and drug abuse leaves no levels of human functioning unaffected; this is why it is considered a “disease of the body, consciousness and soul”.

The effect of psychoactive substances in human body can be very diverse; drugs of various natures may cause the most unpredictable systemic responses. In addition to this, drug abuse causes comorbid disease. HIV/AIDS and viral hepatitis are probably the most terrible companions of drug addicts. In addition, in most cases drug addicts use makeshift chemicals, often heavily contaminated with foreign matter. This is a severe blow to the liver, where inflammation develops in response to the foreign matter. In addition to this aseptic or non-infectious hepatitis, the population of intravenous drug users is heavily infested with viruses of hepatitis B and hepatitis C, a potentially lethal disease in its own right.

Many sources claim that marijuana is a “soft” drug. However, is “soft” safe? Not really; smoking the pot may affect the lungs to even greater extent than smoking tobacco, since the cannabis contains 4 times greater quantities of tars. Most regular pot smokers suffer from chronic bronchitis. In addition, it has long been known that the so-called “soft” drugs are just the first step down the ladder of drug addiction.

The use of “heavy” drugs such as morphine and other opiates (heroin; methadone to a lesser degree) may cause paralysis of the intestines and the respiratory tract. Cocaine use poses an immense risk to the heart. Cocaine abuse is associated with depression, paranoid ideation and hallucinations. The hallucinogenic drugs lead to a gradual loss of memory and a decline in mental capacity. As a result of repeated use, psychoses and some other mental disorders may occur. The substance abuser develops a persecutory mania, paranoia, etc. In such a state, the person may have sudden mood changes and nervous breakdowns; they are often inclined to violence and are able to inflict physical injury upon themselves and/or other people.

The nature has given the human an immense vital potential, and only the individual themselves may decide what to do with that wealth. Improper nutrition, passive lifestyles, avoiding sports and physical activity, smoking, excessive alcohol consumption and stress: all these steal away the years and sometimes decades that a person could have lived otherwise. A drug addict may irretrievably lose a half of their potential lifespan.

As a rule, all people have great opportunities to strengthen and maintain their health, and to maintain working capacity, physical activity and vigor for many years to come. Everyone dreams of a long and happy life, full of bright and interesting events and exciting travel. Everyone wants to reach heights in their chosen profession and in their favorite hobby. Naturally, no one wants to know what gastritis or atherosclerosis is from their personal experience. This is why it is so important to take care of one’s body and health, since the health is the cornerstone of a long and happy life. Physical and mental health underlies longevity and is an essential precondition for implementation of creative plans, high-performance work, creation of a strong family and giving birth to and upbringing of healthy children.

Based on the results obtained in this series of the research study, it follows that the surest path to longevity is a healthy lifestyle. Thanks to this, an individual will be able to live a long and happy life, in which there will be no place for fatigue, apathy, depression and disease. Physical fitness involving various physical exercise, calisthenics, cold training and respiratory exercise; tourism; quality sleep and proper nutrition, and, of

course, abstaining from pernicious habits, largely contribute to strengthening the body and increasing life expectancy. A healthy lifestyle is the driving force. It is a healthy lifestyle that allows an individual to maintain youth and activity for many years.

CHAPTER 4

A GERONTOLOGY NURSE AND THE SPECIFIC ASPECTS OF WORK WITH THE OLDER PATIENTS

The nurse working with older patients should be competent in the specific features of convalescence and rehabilitation of patients in a gerontological center.

The rate at which the patient's recovery and rehabilitation proceeds does not only depend on the quality of treatment and the prescribed medications. A great role is played by the psychological impact exerted on the patient by a healthcare professional.

An immediate psychological contact with the patient is more frequent in nursing personnel. The nurse should be capable of proper communication with patients at different stages of disease development and from different social, racial, religious and age groups.

Communication with different individuals requires a nurse to display such qualities as benevolence, patience, empathy, tolerance, acceptance, and self-congruence. In addition to that, any healthcare professional is expected to comply with the ethical code of communication with the patient, respect the patient's right to choose their healthcare provider, healthcare institution and methods of treatment, right for privacy of health information and the right for privacy.

Without exception, all medical workers should be able to communicate with the patient correctly, to maintain a dialogue, taking into account the peculiarities and personality changes in connection with the disease and/or the age.

The general rules for communication with patients of any categories include the following:

1. In the beginning, the nurse should introduce him/herself.

2. There should be a genuine concern for the patient's problems and the desire to help.
3. The nurse should manifest benevolence.
4. The nurse should respect the person's feelings and understand the rationale behind their actions.
5. The nurse should avoid being judgemental and criticizing, but at the same time should be able to point out the patient's mistakes without hurting the patient.
6. The nurse should listen attentively without interrupting the patient.
7. The nurse should address the patient in a formal respectful manner (i.e. using the first name with the patronymic middle name in Ukraine).
8. When posing questions, the nurse should use a patient-friendly lay language avoiding specialist terminology.
9. The nurse should use non-verbal communication; establish eye contact (as culturally appropriate) and using approval gestures.
10. The nurse should maintain a distance comfortable for the patient.

When communicating with older patients, the nurse should take into account the special aspects of their age-associated psychology.

The following characteristics are typical for the psychology of older people:

1. Sensation of helplessness, sadness and loneliness. Older people often feel lonely. They are not interested in the things that attract the younger generation, and their peers, with whom they could talk about the "good old days", are becoming fewer in numbers, due to obvious reasons. When they feel lonely, the older people retire into themselves, alienate from the outside world and begin to display more nervousness and moodiness. Simple understanding is often the best remedy in this case. The patient seeks to be listened to, to be talked to and to be encouraged. If such patients do not receive (or think they do not receive) enough attention, they develop depression; the patient begins to "listen carefully to the pain" and attempt to find "new" medical conditions.

2. The psychological dominant of the age. Sensation of the pending doom is a dangerous psychological factor. The patient may refuse to take medications and to attend therapeutic procedures; the patient spends a lot of time in bed and refuses to talk. However, the cases when the patient openly refuses to follow their doctor's orders are much less frequent than covert non-compliance, when the patient agrees to follow the orders, but fails to do so. The technique of persuasion should be used in such patients. It is important for the older patient to feel they are important and not to give up on treatment.

The role of the healthcare professional in this case is to assure the patient of a probable positive treatment outcome, to arrange for frequent visits by relatives and friends and to create a comfortable milieu around the patient, which would motivate them to regain their purpose in life.

3. Interpreting the disease by age. This is a special case of the previous factor. However in this case the patient fails to comply not because of sensation of the pending doom, but rather explains all of their health problems by advanced age, persuading themselves that there is no way to treat them. Similar to the previous case, the nurse should motivate the older person to follow with the treatment, to take the medications and to attend therapeutic procedures.

4. Increased sensitivity and vulnerability. The nervous system becomes weaker with age; in this connection, the individual may have stronger feelings of sensitivity and vulnerability. Older people often invent grudges against their family or the surrounding people or greatly overestimate the significance of certain words or actions. Communication with such patients should occur in a calm and benevolent tone; it is important to earn trust and show a desire to help. In addition, it is necessary to completely exclude any criticism towards the patient. However, the nurse should rule out other physical or mental disorder as the cause for such heightened resentment. When the patient becomes paranoiac (for example, when the patient suspects that everyone around them has conspired to kill them), the nurse should request consultation by a mental health professional.

Now what is the cause of so many differences between the old and the young organism? The process of aging in itself.

Physical aging is characterized by a gradual wear of “life support systems” (i.e. vital organs), loss of elasticity in muscles and skin, ossification of cartilaginous tissues, increased fragility of bones, weakened immunity and by remarkable changes in a person's appearance (the appearance of wrinkles and sagging skin). In course of aging, organs of senses partially or completely lose their functions.

Reduced capacity of the body to adjust to environmental conditions (as one of the signs of aging) characterizes the changes in the bodily systems responsible for regulation of the internal environment of the body. The capacity to maintain a constant body temperature, glucose level and hydrogen ion concentration in the blood, etc. Changes apply to other systems as well.

Geriatrics solves one, but very important problem: how to influence the aging process in such a way as to reduce the risk of age-associated disease and provide the person with a comfortable old age.

Gerontology can be considered the "Queen of Clinical Medicine", because by reducing the rate of aging in a person, we can stop the development of many diseases in that individual. The solution to this problem implies a direct and close interaction of the older patient with the healthcare personnel, which is fraught with many difficulties and pitfalls. First of all, there should be no negative attitude towards helping the patient based on the patient's age and feebleness or because the health professional considers such help futile. The body in the older patients often retains the reserves to improve health despite the development of disease.

When working with geriatric patients, it is important to remember about their mental vulnerability and maintain a psychological contact. The patient encounters many stressful situations; the properly structured actions by the personnel should help the patient cope with these situations. During hospitalization, the patient may feel uncomfortable due to certain unavoidable

circumstances, i.e. the need to sleep and eat when other patients are present, to undergo examinations and interviews and to be physically away from the family. Strict disciplinary policies have negative effects, irritate the patient and inhibit his/her interest in recovery and in life in general.

Therefore, communication with older patients requires special patience and the ability to achieve goals not by violently ordering the patient, but by tactful explanations. Such a healthcare professional will win the patient's trust, which will greatly facilitate any future work with this patient.

The objective of the Director of Nursing in the gerontological center is to recruit the employees capable of complying with all disciplinary and ethical rules for communicating with the patients and fulfillment of their professional duties. The team member should understand that he/she is dealing with the patients possessing a number of special age-related characteristics; in addition, this healthcare worker should be compliant with job instructions and be ready to render psychological and physical assistance. Without these qualities, the healthcare worker will not be able to provide the necessary care on time, which can lead to irreparable consequences.

This is exactly why great attention needs to be paid to organizing the work of nursing personnel; the nursing supervisor of the department/unit handles these organizational matters.

Planning of nursing care. The planning should be started with defining the goals and the expected outcomes of nursing care. The main objective in nursing practice is a positive outcome of interventions aimed at solving the patient's problem. This means that any patient care action should be aimed at achieving the outcome. The definition of the goal is orienting in nature; that is, it is essential for choosing the direction of patient care and for assessing the effectiveness of the nursing work. Patient involvement in the planning of care is required for better definition of the goal. Patient involvement in care planning should be independent; the same is true for setting priorities and making decisions. If the patient is unable to participate in decision-making and setting

therapeutic objectives independently due to being comatose or disoriented, or due to loss of speech or stroke, the relatives should be involved in this process. Sometimes the nurse may need to plan patient care independently.

The goals of patient care should be aimed not only at the convalescence as such, but also on subsequent rehabilitation and at the measures to prevent the disease.

All measures aimed at patient care should ultimately take effect. The result achieved includes changes in mental, cognitive and physical condition of the patient. The statement of the expected result has its own functions:

- Helps give direction to nursing activity;
- makes it possible to provide additional resources;
- determines the criteria for achieving the goal;
- helps to calculate the time to reach the goal;

Implementation of the care plan

According to the theory, drawing up a care plan is followed by carrying it out. However, in a real world setting, implementation frequently must be started immediately after examining the patient. The indications to immediate implementation of the nursing care plan may include the following: direct threats to the patient's physiological and psychological wellbeing, such as severe pain, unrestrained vomiting, nervous breakdown, etc.

The implementation of the plan includes the following: providing physical care and psychological assistance, educating the patient and the family, self-care activity management, assessment of the entire team's work, and documentation and sharing important information for treating the patient.

Implementation of the nursing care plan implies nursing interventions. Nursing intervention is any action by the nursing personnel, which sets in motion a care plan or any task of said plan. Nursing interventions may include providing care and performing life-related activities, counseling the patient, providing instructions to the patient's family, patient care to achieve treatment

goals, creating conditions for a speedy recovery of the patient. Any nursing interventions are to be documented in the patient's nursing record.

Evaluation of care efficacy. At the final step, the nurse evaluates the actions taken and adjusts the care plan if necessary. Evaluation is performed at the patient's discharge, at transfer to a different department or a different healthcare facility, and after a lethal outcome of the disease. The evaluation process is an intellectual activity when the nurse(s) will need to compare the actual care outcomes with desired ones. The following is required to conduct an objective evaluation:

- Clarify the stated objective and the expected outcome.
- Compare the evaluation criteria with the actual response or behavior of the patient.
- Evaluate whether the patient has a desired response or behavior.
- Define the congruity between the goals and the response in the patient.

The sources for the evaluation include the patient themselves and the opinions of the family members/roommates/all healthcare professionals involved in the patient's treatment. In the event of partial attainment of the goal or its complete non-achievement, analysis of the causes for failure should be conducted. Causes for failure:

- Lack of psychological rapport between the healthcare professional and the patient;
- communication problems related to not understanding the patient's language;
- incomplete or inaccurate information collected at the time of the patient's admission;
- misinterpretation of problems;
- unrealistic goals;
- unwillingness to ask colleagues for help if necessary;

- insufficient patient participation in the process of creating a care plan.

In case of incomplete achievement of the goal (i.e. recovery or improvement of the patient's health), all stages of nursing treatment must be repeated. At the end of the patient's stay in the healthcare institution, the nurse issues a health record referred to as discharge summary, where the nurse lists the problems in the patient upon admission, any health problems that have developed in course of treatment, the patient's response to care; any problems remaining at discharge, and the patient's feedback on the care that had been provided.

In this series of the research study, we reviewed and evaluated the characteristics of the factors that influence disease in the older patients.

The main difference of the course of disease in an older patient as opposed to an old patient is that disease symptoms in people of advanced age may change, manifest too strongly or too weakly for a given disease or be completely absent. Many symptoms are attributed to age and dismissed as unimportant, while the physical condition of the body and the mind late in life often borders on abnormal.

In addition to that, many diseases can be latent and manifest unexpectedly with an acute presentation under the influence of an adverse environmental factor or as a result of a mental disorder. All this makes it difficult to make a diagnosis, select a treatment method and medications and to start treatment as such. Most medications may potentially harm an aged patient; therefore, they should be prescribed and taken with caution, some under the supervision of a physician. The incidence of many adverse effects is many times higher in the senile age compared to the younger age.

Undesirable effects of drugs may appear as symptoms of the disease and aggravate the negative effects of the disease on the physical, psychological and intellectual state of the patient. Many drugs are entirely prohibited in people of

the older age. Therefore, during collection of patient's history, the healthcare professional should clarify what medications the patient is taking.

Another difficulty in making a full diagnosis is that almost no disease in a geriatric patient is isolated and more often than not is a chronic condition. In most cases, one disease leads to another disease or abnormal process within the body.

Symptoms of several diseases may overlap, mutually exacerbating each other, which leads to a more intense progression of the disease.

One of the major factors that determine the general health of a person is immunity. As a natural defense system of the body, immunity is often compromised in older people, which has consequences.

Human immune status is influenced by lifestyle, nutrition, place of residence, the presence of pernicious habits, nervous stress, disease and hereditary changes. Currently approximately 24% of older people in the world are combat veterans/ex-combatants or have had other adverse impacts in their lives. The conditions during the war and the post-war period, to name a few: shortage of food and water, constant stress combined with hard physical labor and often pernicious habits, have caused irreparable harm to the body at a young age, which has later manifested as numerous acute and chronic diseases.

Currently, many people in the old age are habitually alcoholic beverages and have a negative habit of smoking. This impairs the immunity and triggers cardiovascular disease, respiratory disease and problems with other organs and systems. In addition to that, many older people have a low-activity lifestyle, which, in turn, when combined with unhealthy diet, leads to obesity and diabetes mellitus, musculoskeletal disease, etc.

The influence of environmental factors on the body should not be underestimated. The environment today is in a critical condition. If this influence is not so strong in rural areas, in large cities environmental factors have a strong negative impact on the general state of the body and human immunity.

The general condition of the body is influenced by such factors as natural and artificial lighting, the temperature of the air and surrounding surfaces, humidity, and the speed of air moving in the room. Healthcare professionals should monitor these parameters in the facilities for the older people.

As for infections in elderly patients, overall tolerability of bacterial and viral infections in the elderly is worse than in patients of other age groups. Infectious disease in the older patients tend to be protracted, may often have an atypical presentation and poorly respond to treatment. Bacterial and viral toxins are poorly tolerated by older individuals; many toxins are poorly excreted from the body and tend to accumulate. This is why infectious disease, remarkably COVID-19, is often fatal in the older patients.

CHAPTER 5

SPECIFIC ASPECTS OF NUTRITION IN OLDER PEOPLE TO ACHIEVE LONGEVITY AND IMPROVE THE QUALITY OF LIFE

The aging process is manifested by the natural development of changes in the structure and function of various organs, including the organs of the digestive system. Among all the changes occurring in the body during the advanced years, the most pronounced changes are seen in the oral cavity, esophagus, intestines and other digestive organs, namely:

- Any remaining teeth have a yellowish tint and varying degrees of wear.
- The volume of the oral cavity and salivary glands decreases, the filiform papillae of the tongue disappear; the mimic and chewing muscles, as well as the bones of the facial skull, undergo atrophy.
- With age, the production of saliva decreases; therefore, older and old people often complain of dry mouth and labial fissures and/or fissured tongue.
- As the person ages, the esophagus gets somewhat longer and curved due to increasing kyphosis of the thoracic spine and dilatation of the aortic arch.
- There is an age-dependent increase in the incidence of reflux of stomach contents into the esophagus, which is associated with a reduced muscle tone of the esophageal sphincter.
- The overall length of the intestine increases; elongation of individual sections of the colon is seen more frequently
- There are changes in intestinal microbial flora with more putrid bacteria and less Lactobacilli, which contributes to increased production of endotoxins and ultimately dysfunctional state of the intestine and development of an abnormal process.
- The weight of the liver is decreased.

- The gallbladder is enlarged due to elongation and altered muscle tone of its wall, which also contributes to cholestasis. Combined with increased cholesterol secretion, this factor creates the preconditions for cholelithiasis in the older and senile people.

- Atrophic changes in the pancreas begin to develop already after 40 years of age.

Unhealthy nutrition in an older age often leads to such serious diseases as chronic gastritis, peptic ulcer, chronic hepatitis, chronic pancreatitis, chronic colitis, diabetes mellitus, etc.

In order to avoid such disease, one should be thoroughly compliant with the healthy dietary principles, supply the body's demands in nutrients and follow the dietary regimen.

Compliance with dietary principles. The first thing to consider in dietary planning for the older individuals is the reduced capabilities of the digestive system. In this regard, the principal requirements to nutrition of older people include moderation, i.e. somewhat limiting the nutrition in terms of quantity.

Another aspect to consider is providing a high biological value of the diet by including sufficient amounts of vitamins, trace nutrients, phospholipids, polyunsaturated fatty acids, essential amino acids, etc.

It is also important to enrich the diet by naturally occurring anti-atherosclerosis substances, plenty of which can be found in some wholesome foods.

Nutrient requirements. Fully supplying the needs of an aging organism with nutrients is a sure protection against disease. We have studied some of the specific aspects of nutrient requirements of advanced age, namely:

- Protein requirement. Reduction in overall work capacity in an older age and cessation of physically intensive labor is viewed as the rationale to reduce protein consumption. However, older people continue to require regeneration of worn-out cells, which requires protein (and the larger quantities, the more intense the tissue wear).

- Fats requirement. Fats should be limited in the diet of older individuals. A connection has been established between generous consumption of fats and atherosclerosis. It is advisable to prefer vegetable oils over butter. Approximately 20-25 g of vegetable oils per day provides a sufficient supply of the nutrients that are very important in an older age (such as polyunsaturated fatty acids).

- Carbohydrates requirement. In the generally accepted formula of balanced diet, the amount of carbohydrates is on the average 4 times the amount of protein. However, such a protein to carbohydrate ratio is only acceptable in the older people who live active and mobile lives. If the physical activity is low, the amount of carbohydrates should be reduced. The preferable sources of carbohydrates include wholegrain products (rye and wheat bread with bran, etc.), as well as potatoes and other vegetables. It is also advisable to use the foods that contain large amounts of fiber and pectin. Fiber helps to eliminate cholesterol from the body.

Of particular value are raw vegetables and fruits, which exert the best biological effects.

Vitamins requirement. Due to their properties, the vitamins are able to slow down the aging process to a certain extent. Of special importance are the vitamins that improve the condition of the vascular and the nervous system, as well the vitamins that participate in the responses associated with inhibition of the atherosclerotic process, i.e. the following vitamins: C, P, B12 and B6.

Minerals requirement. In older individuals, the dietary balance of minerals is less important than in early and middle adulthood.

However, calcium of special significance in the diet of older people. On the one hand, they require calcium to fight osteoporosis. On the other hand, excessive dietary calcium leads to calcification (salt deposits) in vascular walls, in the joints, the cartilages and other tissues in the body.

The currently recommended daily consumption of calcium for older people is the adult normal, i.e. 800 mg per day.

An important mineral nutrient in an older age is magnesium. It exerts an antispasmodic and vasodilating action, stimulates intestinal motility and enhances bile secretion. Magnesium has been found to reduce cholesterol in the blood. Magnesium deficiency leads to an increased calcium content in vascular walls. The main sources of magnesium in human diet are cereals and legumes. The daily requirement for magnesium is 400 mg.

Potassium is also playing an important role in an older age and later in life. It enhances elimination of water and chlorides from the body. In addition to that, potassium supports cardiac contractility. Virtually all foods in the diet contribute to daily potassium intake. However, in an older age, the best sources of potassium include raisins, apricots, and potatoes.

In older people, it is preferable to increase the alkaline component of the diet due to consumption of milk and dairy products, potatoes, vegetables and fruits.

Iodine deficiency is a problem in many countries across the globe. Therefore, iodine supplementation is important for the aging individuals. Prevention of iodine deficiency is essential by using iodine-treated salt or by taking potassium iodide supplements at a daily dose of 150 µg.

The specific aspects of dietary schedule in an older age.

In an older age, the dietary schedule is of special importance for prevention of aging. The basic principles of dietary routine in older people include the following:

- having meals at strictly the same time;
- limiting the amounts of food consumption;
- avoiding long intervals between meals.

Four meals a day are recommended. Some individuals may need a routine of five meals a day. Such a routine is justified in an advanced age, when food may need to be taken in smaller servings and more frequently than in the younger age. In 4 meals a day, the daily nutrient value is distributed in the

following manner: breakfast 25%, second breakfast: 15 %, lunch 35% and evening meal 25 % of the daily nutrient value.

We have developed a sample daily ration for older people.

Breakfast: omelet 100 g, oat milk porridge 150 g, tea with milk 150/50 g.

Second breakfast: fresh fruits or berries: 150 g or a baked apple 130 g.

Lunch: carrot salad with sour cream 100 g, vegetarian cabbage soup (with vegetable oil) 250 g, boiled fish baked with mashed potatoes 85/150 g, dried fruit drink 150 g.

Midday meal: rosehip broth 150 ml or vegetable juice/fruit juice 200 ml.

Evening meal: Curd pudding 100 g; cabbage rolls stuffed with vegetables (cooked using vegetable oil) 150 g.

At bedtime: Kefir 200 ml.

For the whole day: bread 250-300 g, sugar 30 g, and butter 10 g.

It is worth mentioning that sedentary lifestyle and overeating are most dangerous vices that shorten one's life.

Overall, the researchers have not arrived at unanimous agreement regarding the causes of dramatic increases in life expectancy. Some attribute this to the development of the civilization: from living in caves, humans moved to warmer and more secure dwellings, provided themselves with sufficient amounts of food, invented medicine, etc. Other researchers suggest evolutionary development of humanity as an explanation.

Whatever the case, the quality and the quantity of nutrition has a decisive impact on vitality of humans at any age and even more so in the older persons.

Many scientists argue that the main thing for longevity is to eat less, i.e. that low-calorie diets prolong life. Low-calorie diet is one of the methods to prolong life, as demonstrated in animal models across different species. For example, there is a long-term experiment ongoing in the United States since 1987 in two species of non-human primates. When caloric value of the diet is reduced by 30–40%, the monkeys show signs of decelerated aging and lower incidences of cancer and cardiovascular disease.

Japan is the world's leading country in terms of centenarians per 10,000 of population. Within Japan, this proportion is the greatest on the island of Okinawa. Ethnic Japanese living on this island consume less than 2,000 kilocalories per day. There are many centenarians in Scandinavian countries, where watching the calories is customary, and in Italy, where a low-calorie Mediterranean diet is popular. This diet is considered most beneficial for health, slowing down the aging process. It includes lot of vegetables and fruits, fish, seafood and little meat.

The calorie cuts should be made at the expense of carbohydrates and fats, i.e. people should limit sweet and fried foods. Having a hearty meal at or before bedtime is not a good idea. Apart from obvious dietary disadvantages, this will disrupt the night's sleep. At night, the body repairs the damage sustained during the day. However, when people indulge in overeating, their immunity may be compromised and the repair capacity of the body is substantially lost.

It is also worth mentioning that anger, envy; despondency, melancholy and bigotry are important causes of disease and reduced life span.

Below are some principles that help live a longer and happier life:

- Strong commitment to freedom and autonomy. Under all circumstances, an individual should remain free and autonomous inside.
- Adherence to healthy lifestyle principles.
- Observing the healthy routine of work, active rest and balanced diet.
- To flee from sickness and live longer, one should move more.
- Simple physical exercise and walks are more important for the older person than food.
- Moderate and reasonable physical activity can yield a fivefold increase in production of the endorphins, popularly referred to as “hormones of happiness”.
- It is necessary to give up pernicious habits (such as smoking, consumption of alcoholic beverages, etc.).

- Active work of the brain is required to maintain memory and mental acuity. Leaving no chances for brain activity to wither: as much as possible, the individual should continue professional activity, help the younger colleagues in the field, write essays and books, learn foreign languages, solve crossword puzzles, memorize verses, etc.
- Keep an eye on the heart rate and blood pressure. The normal heart rate is 60-70 beats per minute. Blood pressure in persons aged 60 years and above should not exceed 145 over 80-90 mm Hg

It should be always kept in mind that only a happy person may live a long life, and this largely depends on the people themselves.

CONCLUSIONS

1. The authors have investigated the specific aspects of Gerontology as a science and the major aspects of gerontological medical care.
2. The authors have determined the specific aspects of geriatric care provided in geriatric centers, and have studied the structure of such centers.
3. The authors have studied the principles behind the operations of gerontological service during the COVID-19 pandemic.
4. The authors have explored the potential for training healthcare personnel to provide high-quality care in geriatric patients.
5. The authors have determined the factors that influence longevity and health in the older age.
6. The authors have investigated the specific aspects of work of a gerontology nurse and the specific aspects of work with older patients.
7. The authors have studied the factors that influence disease in the older patients.
8. The authors have determined the specific aspects of nutrition in older people to achieve longevity and improve the quality of life.

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