MINISTRY OF HEALTH OF UKRAINE

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UDC: 616.892.32/.34-083

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Master's Thesis

MEDICAL CARE IN ELDERLY SUBJECTS WITH MENTAL HEALTH ALTERATIONS: ALZHEIMER'S DISEASE, DEMENTIA AND VAGRANCY

Master of Science in Nursing

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Ternopil – 2022

Abstract

Alzheimer's disease and other types of dementia are currently among the top ten causes of death worldwide, ranking 3rd in the Americas and Europe in 2019. Dementia is very common in older men and women; however, women account for 65% of worldwide deaths related to Alzheimer's disease and other forms of dementia. As we know, mortality from COVID-19 among older people and people with comorbidities is much higher than in the general population. As the researchers tend to agree, dementia is associated with a higher risk of death in such patients. In the setting of COVID-19 pandemic, the management of elderly patients with dementia and neuropsychiatric symptoms is a particularly challenging task, mainly due to the lack of routine screening programs for infection, isolation from family members who otherwise helped monitor the condition of their significant other, and due to a general lack of widespread use of non-pharmacological dementia treatments. Nurses are playing a primary role in the provision of such care by conducting all the necessary diagnostic, as well as therapeutic and preventive measures in elderly patients, and by providing advice to their relatives and significant others.

The data for this project was to explore the modern options and characteristic features of providing medical care to elderly patients with mental health alterations, such as Alzheimer's disease, dementia and vagrancy.

When studying the specific aspects of providing medical care to patients with Alzheimer's disease, dementia and vagrancy were used general clinical assessments, special methods for assessment of patients with dementia, collection of health history, collection of history of present disease, conducting patient monitoring, physical examination, conducting general health assessment, laboratory, instrumental and imaging tests. For the scientific analysis of study results, were used the scientific methods of comparison, system analysis and statistical methods.

It was studied the specific aspects of mental alterations, clinical manifestations in Alzheimer’s disease and other types of dementia in the elderly, the specific aspects of development and diagnosis of Alzheimer’s disease and other types of dementia in the elderly, was determined the most common risk factors for dementia of the elderly and Alzheimer's disease.

The author have investigated and determined the modern options and prospects of various methods of treatment of Alzheimer’s disease and other types of dementia in the elderly.

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INTRODUCTION

The relevance of the study. Alzheimer's disease [2, 6, 15, 29,34] and other types of dementia [4, 5, 26, 28, 44] are currently among the top ten causes of death worldwide, ranking 3rd in the Americas and Europe in 2019 [45]. Dementia is very common in older men and women [13]; however, women account for 65% of worldwide deaths related to Alzheimer's disease and other forms of dementia [31, 45].

Neuropsychiatric symptoms, such as anxiety, depression, agitated apathy, etc. complicate the care of patients with dementia and are often associated with deteriorations in their health [2]. Currently, there are reports of a sharp increase in the severity of such symptoms during the COVID-19 pandemic [44, 45]. As we know, mortality from COVID-19 among older people and people with comorbidities is much higher than in the general population. As the researchers tend to agree, dementia is associated with a higher risk of death in such patients [31, 45]. It is likely that the increased mortality in older people with severe dementia is caused not only by their vulnerability to the SARS-CoV-2 infection, but also by the cognitive, behavioral, and psychological consequences of rapid environmental changes due to the current pandemic. Increases in the severity of cognitive impairment in elderly patients with dementia have been reported within months after the onset of the COVID-19 pandemic.

Dementia of the elderly [4, 5, 28, 35] is characterized by a sharp increase in the severity of neuropsychiatric symptoms, in particular depression, anxiety, anger, insomnia and vagrancy [1, 5, 9, 11, 39, 41, 42].

According to researchers, these complications not only increase the level of distress in family caregivers and staff of residential facilities [2] and medical institutions, but also the risk of infection, self-injury, hospitalization and death [44, 45].

In the setting of COVID-19 pandemic, the management of elderly patients with dementia and neuropsychiatric symptoms is a particularly challenging task, mainly due to the lack of routine screening programs for infection, isolation from family members who otherwise helped monitor the condition of their significant other [7, 8], and due to a general lack of widespread use of non-pharmacological dementia treatments [4, 23, 24, 25, 27, 29].

This causes an urgent need to study the psychopathological presentations in elderly people with cognitive disorders, as well as the possible treatment strategies [4, 34] needed to manage such patients.

This problem is most relevant in elderly people, and since there is a significant and rapid growth in the numbers of elderly and senile people around the world, the relevance of dementia in the elderly [45] is beyond doubt.

Since the beginning of the last century, average life expectancy has almost doubled. In the near future, older people are expected to make up 20–30% of the entire population in many countries [31, 45]. In the age group of 65-69 years, the incidence of dementia is 2.4–5.1%, with up to 10-12% at the age of 75-79 years, and up to 24% in people from 80 to 90 years old.

Dementia is a condition acquired as a result of organic brain damage, impaired intellectual activity, deficiencies in memory, abstract thinking, cognition, speech and other cognitive functions, which inevitably leads to impaired activities of daily living and social (including professional) maladjustment [26, 44].

The disorder may be progressive, static or reversible. The severity of dementia is determined by impaired personal activity in everyday life; the duration of symptoms should be at least 6 months; the course of the disease is chronic or progressive [4]; the exclusion criterion is impaired consciousness.

Sometimes patients with dementia are prone to vagrancy [10, 39, 40, 43], which is a source of much anxiety and worries to the family [7, 8] and caregiver personnel [2, 25, 26].

The characteristic disorders in dementia involve the intellect (i.e. memory, thinking); less common symptoms of dementia in the elderly include aimless wandering and vagrancy [9, 41, 42], more often at nighttime. According to many relatives, vagrancy [5, 10, 41] is a most problematic factor within the manifestation of the disease.

The medical care in mental health alterations in the elderly, in particular, those with Alzheimer's disease [3, 14, 15, 21, 25, 37, 38], dementia [5, 26, 28, 44] and vagrancy [10, 35, 39, 40] should be based on scientific research evidence. Nurses are playing a primary role in the provision of such care [2, 25, 26] by conducting all the necessary diagnostic [11, 12, 28, 29, 36], as well as therapeutic and preventive measures [34] in elderly patients, and by providing advice to their relatives and significant others.

The aim of the study: to explore the modern options and characteristic features of providing medical care to elderly patients with mental health alterations, such as Alzheimer's disease, dementia and vagrancy.

Study objectives.

1. To investigate the specific aspects of mental alterations in Alzheimer’s disease and other types of dementia in the elderly.
2. To determine the most common risk factors for dementia of the elderly and Alzheimer's disease.
3. To study the specific aspects of development and diagnosis of Alzheimer’s disease and other types of dementia in the elderly.
4. To study the specific aspects of clinical manifestations in Alzheimer’s disease and other types of dementia in the elderly.
5. To investigate and determine the modern options and prospects of various methods of treatment of Alzheimer’s disease and other types of dementia in the elderly.

The object of research. Older patients with mental health alterations, including such conditions as Alzheimer's disease, dementia and vagrancy.

The subject of research. The role of the nurse in development of modern options of providing medical care to elderly patients with mental health alterations, such as Alzheimer's disease, dementia and vagrancy.

The methods of study: when studying the specific aspects of providing medical care to patients with Alzheimer's disease, dementia and vagrancy, we have used the following methods:

- general clinical assessments,
- special methods for assessment of patients with dementia,
- collection of health history,
- collection of history of present disease,
- conducting patient monitoring,
- physical examination,
- conducting general health assessment,
- laboratory, instrumental and imaging tests.

In our research work, we have also used analytical and statistical methods.

The scientific and practical value of the study. Medical care in mental alterations in elderly subjects with Alzheimer's disease and other types of dementia is becoming increasingly important, which determines the relevance and practical bearing of this research study, which has determined the most common risk factors for dementia of the elderly and Alzheimer's disease; investigated the specific aspects of development and diagnosis of Alzheimer's disease and other types of dementia in the elderly; investigated the specific aspects of clinical manifestations in Alzheimer's disease and other types of dementia in the elderly, and also investigated and defined the modern options and prospects of various methods of treatment of Alzheimer's disease and other types of dementia in the elderly.

CHAPTER 1
PSYCHIATRIC DISORDERS IN ELDERLY SUBJECTS WITH ALZHEIMER'S DISEASE, DEMENTIA AND VAGRANCY (REVIEW OF LITERATURE)

At least 44 million people in the world live with dementia [4, 5, 26, 28, 44], making it a global problem calling for attention. The expected prevalence of dementia will reach 65.7 million by 2030 and 115.4 million by 2050 unless methods to prevent [34] or slow down the development of the disease [23, 24, 25, 27, 29] are developed. Age is a major risk factor for developing dementia. The most common direct cause of this condition in elderly people is Alzheimer's disease (AD) [2, 3, 6, 37, 38].

Dementia is a general term for a cognitive decline severe enough to interfere with daily activities. Alzheimer's disease is the most common type of dementia [29, 34], which accounts for at least two-thirds of dementia cases in people aged 65 years and over.

The development of dementia can have different causes [15, 21, 29]. The development of dementia is always based on an organic brain damage; sometimes it is possible to identify a specific organic factor that has caused it.

To date, new aspects of AD pathogenesis continue to be discovered as a result of completed and ongoing studies [21, 29]. Previously known pathophysiological mechanisms of AD come to the fore and are used in the development of medicinal products [4, 23, 24, 27, 29]. There are ongoing studies into the role of tau protein in the formation of neurofibrillary tangles, as well as the role of β-amyloid (Ab) in the formation of neuritic (senile) plaques. Neurofibrillary tangles and plaques are found predominantly in AD, but they can also be seen in frontotemporal dementia and in other related disease.

Both neurofibrillary tangles and amyloid plaques are found in natural ageing process, but AD is characterized by excessive amounts of these microscopic lesions. During plaque formation, amyloid precursor protein (APP)

is cleaved into smaller protein fragments [6, 21]. The largest of these fragments consists of a chain of 42 amino acid residues and is referred to as Ab. Misfolding of this protein leads to the formation of neurotoxic plaques, although there is increasing evidence that soluble amyloid Ab fibrils, which are forming oligomers, are a serious cause of neuronal damage. Mutations in the genes that encode APP, presenilin 1 and presenilin 2 (causes of familial cases of AD), as well as the presence of the ApoE4 allele, cause an increase in Ab plaques.

Tau protein is playing an important role in the formation and stabilization of microtubules in the neurons [11, 12, 28, 29, 36]. Phosphorylation of the tau protein is necessary for its binding to microtubules, and its hyperphosphorylation leads to a number of disorders. As a result, microtubules are destroyed, tau protein filaments aggregate, and formation of neurofibrillary tangles takes place. In general, these neuronal disorders cause cell death and are of great importance in the development of the disease in question [21, 29].

Alzheimer's disease is a neurodegenerative disease with a subtle onset and progressive impairment of behavioral and cognitive functions, including memory, comprehension, speech, attention, reasoning, and judgment [2, 3, 25, 37]. It is the sixth leading cause of death in the US and many other countries worldwide. An onset before the age of 65 (early onset) is uncommon and occurs in less than 10% of patients with Alzheimer's disease. Alzheimer's disease is incurable, although there are treatments [4, 23, 24, 25, 27, 29] that may improve some symptoms.

When an individual is diagnosed with Alzheimer's disease, this brings about radical changes both to his/her life and to the lives of his/her family members, significant others and friends [7, 8]; however, the information and support should be available to all who need them. No one should be left alone with this problem, be it Alzheimer's disease [3, 6, 37] or other dementia [4, 5, 28].

The symptoms of Alzheimer's disease depend on the stage of the disease. Alzheimer's disease is divided into preclinical (pre-symptomatic), mild

and dementia stages, depending on the degree of cognitive impairment [13, 15, 34, 38]. These stages differ from the DSM-5 classification of Alzheimer's disease. The initial and the most frequent symptom is intermittent short-term memory loss with a relatively intact long-term memory, which may be seen in the majority of patients. The short-term memory impairments are followed by difficulties in problem-solving, judgment, executive functions, and lack of motivation and self-organization, which leads to problems with multitasking and abstract thinking.

In the early stages, impairments of executive functions vary from mild to significant. This is followed by speech disorders and impaired visual and spatial skills. Neuropsychiatric symptoms such as apathy, social isolation, disinhibition, agitation, psychosis, and wandering are also common in the moderate and advanced stages.

Difficulties in performing learned motor skills (dyspraxia), olfactory dysfunctions, sleep disorders, extrapyramidal motor symptoms, such as dystonia and akathisia, as well as the symptoms of parkinsonism, develop in the late phases of the disease. This is followed by primitive reflexes, urinary incontinence and complete dependence on caregivers.

To date, the criteria of dementia [12, 28, 36] are well known, these are as follows:

1. Impairments of short-term and long-term memory (based on the evidence from psychiatric interview, subjective and objective health history, as well as neuronal diagnosis and pathopsychological diagnosis).

2. At least one of the following:

- impaired abstract thinking;
- Lack of insight, which is manifested as inability to make plans concerning other people, family members and work-related issues;
- neuropsychological symptoms and syndromes, such as aphasia, apraxia and agnosia (the "three A's"), as well as disorders of optical-spatial functions and constructive activity;

- personality changes.

3. Social maladjustment in the family and at work.

4. Absence of delirium during dementia.

5. The presence of an organic factor in the history of the disease (according to the results of laboratory tests, investigations, etc.).

If a relative or loved one has been diagnosed with Alzheimer's disease [25, 34, 37], the family member concerned should consult the physician for additional advice. Many people seek support from professional Alzheimer's disease organizations online. Some information can be obtained on special profile sites. Such professional information will help a person to better understand the condition and the behavior of their loved one.

Early symptoms such as memory loss and partial loss of certain mental functions may go unnoticed by the patients themselves and by their family [7, 8]. However, as the disease progresses, the symptoms become more severe and can interfere with daily activities. It is becoming increasingly more difficult to perform activities of daily living, such as dressing, washing and going to the bathroom. As a result, a person suffering from Alzheimer's disease is likely to rely completely on the support of their family.

Alzheimer's disease leads to a general deterioration in health and is a fatal disease. The most frequent cause of death is pneumonia, since the disease compromises immunity and leads to weight loss, which increases the risk for throat and lung infections.

In some cases, Alzheimer-type senile dementia is manifested by a propensity to vagrancy [5, 11, 40, 41, 43] and hoarding.

Many health workers and patient relatives point out that a symptom of wandering is sometimes observed in dementia of the elderly [9, 10, 39] (which is especially life-threatening, if the symptom is associated with a severe memory impairment), or mind wandering [1, 16-20, 22, 32, 33], i.e. a condition when the patient’s brain switches from the main idea or task to secondary ones.

There are various types of wandering [1, 5, 22, 32, 35], as well as various etiologies, including both emotional and physiological origins. Any interventions to help the patient should be focused on understanding the causes behind their abnormal behaviors. Contrary to common understanding, wandering may have a beneficial effect on the patient, such as meeting their emotional needs, as well as improvement in physical limitations, e.g. poor circulation/tissue oxygenation or the presence of contractures. Environment management is the best way of confronting wandering behavior. Medications should be viewed as a last resort option.

This disease is currently incurable, despite the availability of a large number of international studies conducted by research center around the world [4, 5, 26, 28, 44].

Alzheimer's disease [2, 3, 13, 14, 29] is characterized by not only by memory loss, apraxia/aphasia/agnosia and changes in communication style, but also by profound personality changes, as well as by behavioral changes and physical changes in the body.

For this reason, people with dementia and their family caregivers [7, 8] may have to face the serious ramifications of this disease, and they may need the services provided by the health system and social services.

The systemic fight against dementia, as well as the prevention of dementia, is one of the most important health challenges of our century [34], especially due to the aging of the population.

Health specialists believe that approximately a half of the known worldwide cases of dementia are associated with known lifestyle risk factors [15], including stress [34], smoking, lack of physical activity, unhealthy dietary patterns, obesity, diabetes, hypertension and alcohol abuse.

Diagnosing the disease [11, 12, 28, 29, 36]. It is very important to diagnose dementia in a timely fashion. In order to correctly diagnose this disease, professional knowledge is required, and this task is mainly assigned to the family physician. During the diagnostic process, the physician needs to rule out

the diseases with the symptoms that resemble dementia, but which are not dementia per se.

The treatment of patients with dementia [4, 23,24, 25, 27, 29]. To date, there is no cure for dementia, but there are treatments that alleviate the manifestations of the disease, depending on the stage of the disease. Drug treatment is recommended in patients with mild to moderate Alzheimer's disease [23, 24]. There are also recommendations concerning behavioral interventions, art therapy [4] and meditation [34].

It is important to continue providing help to the patients so that they could continue living a dignified and enjoyable life. For this reason, the care patients are receiving should be consistent with the course of the disease. As memory lapses and cases of disorientation are becoming more frequent, it is important to strengthen the patient's organizational abilities that may help them compensate for the losses caused by the dementia process.

Over time, people with dementia become incapacitated. A patient suffering from diseases that lead to dementia, such as Alzheimer's disease [3, 15, 21], goes through a process of gradual change from an independent person and master of their life to an individual who needs help with everything. Incapacitation is gradual; being diagnosed with dementia does not automatically imply an inability to make rational decisions.

The family members who are caring for a person with dementia also need help [7, 8]. Most people with dementia are treated in the home by their relatives. Due to the special nature of dementia, it places a heavy physical, emotional and financial burden on the entire family of the sick person. In order to relieve their plight, many countries have established and are successfully running national programs for Alzheimer's disease and other forms of dementia, as well as institutions with organized nursing care [2, 25, 26].

National health systems take on the task of advancing the national dementia program [28, 44], considering this problem comprehensively and with the involvement of other organizations and charities, in collaboration with public

and private senior citizens associations, as well as welfare and insurance organizations.

The aim of such programs is to enable people suffering from dementia [25, 38] and their families to lead decent lives, using their available high-quality services; pay attention to dementia from the stage of risk factor avoidance [15]; carry out activities for the detection and early diagnosis of dementia of the elderly; engage in the treatment of patients at all stages of the disease until the very end; implement the principles of work and treatment in various fields, as well as improve coordination and cooperation between organizations to improve assistance to older people with dementia and their families.

CHAPTER 2
THE OBJECT OF RESEARCH AND METHODS OF STUDY

The object of research involved older patients with mental health alterations, including such conditions as Alzheimer's disease, dementia and vagrancy.

When studying the nursing process in providing medical care to patients with Alzheimer's disease, dementia and vagrancy, we have used the following methods:

- general clinical assessments,
- special methods for assessment of patients with dementia,
- collection of health history,
- collection of history of present disease,
- conducting patient monitoring,
- physical examination,
- conducting general health assessment,
- laboratory, instrumental and imaging tests.

In this research work, we have also used analytical and statistical methods.

We have been investigating and made practical application of the specific aspects of diagnosis of dementia of the elderly and Alzheimer’s disease. In many countries, diagnosis of dementia and a specialist physician’s consultation, including a comprehensive geriatric assessment, are included in the basic list of health services.

In order to organize proper treatment and care for the elderly with dementia, it is very important to diagnose dementia in a timely fashion, which requires professional knowledge and is mainly assigned to the family physician.

During the differential diagnosis, the physician shall rule out the diseases whose symptoms may resemble dementia, but which are not dementia per se. In

these cases, a timely initiated treatment may completely or partially reverse the patient's condition.

In many cases, the assessment will demonstrate that dementia is actually the case, and that it is incurable. Nevertheless, the physician may initiate drug treatment to slow down the manifestations of dementia and to balance behavioral problems. In parallel, symptoms can be controlled through activities that focus on sensory stimulation (e.g, listening to music), cognitive stimulation (creativity, writing, memory games), and physical activity.

The family physician may refer the patient to specialist physicians in the following areas: Geriatrics, Neurology and Psychiatry; this is done under one of the following circumstances:

- ambiguity concerning the diagnosis, even after primary assessment and continued observation;
- a relatively young age of the patient with new-onset dementia, or manifestations of young-age dementia in the patient's relative;
- problems with or lack of response to medications intended to treat Alzheimer's disease;
- the presence of depression or behavioral disorders, especially if the treatment lacks efficacy;
- The need to have an additional person to care for the patient (for instance, in case of behavioral problems), or a need to support the relative who cares for the patient with dementia.

It is possible to conduct an assessment of the dementia patient's status by several different specialists in healthcare institutions who conduct a comprehensive geriatric assessment. This examination is conducted by a specialist team led by a geriatrician working together with a nurse, a social worker and other specialists as needed, i.e. an occupational therapist, a nutritionist, a specialist in exercise therapy (physiotherapist), a psychiatrist, etc.

Establishing a diagnosis of Alzheimer's disease calls for a comprehensive health assessment, which may include the following:

- Family health history
- Neurological assessment
- Cognitive tests to assess memory and thinking
- Blood tests (to rule out other possible causes)
- Neurovisualization

Our research study consisted of several parts.

In the first series of the research study, we assessed the risk factors of Alzheimer’s disease in 56 subjects diagnosed with Alzheimer’s disease.

In the second series of the research study, we determined and studied the signs and symptoms of dementia of the elderly and Alzheimer’s disease in 158 patients with various types of dementia.

In order to assess the capabilities and problems of the health care personnel, we have used a modified health care personnel questionnaire (a total of 57 nurses have taken part). In this study series, we have used Dementia Attitudes Scale (DAS-GR) [28] in order to investigate the attitude of health care personnel towards patients with dementia and Alzheimer's disease (AD).

All the results were analyzed and conclusions were drawn.

CHAPTER 3
DEMENTIA OF THE ELDERLY AND ALZHEIMER'S DISEASE: RISK FACTORS AND SPECIFIC ASPECTS OF DEVELOPMENT AND DIAGNOSIS

Dementia is considered one of the most severe diseases of the elderly. It is caused by several degenerative diseases that lead to brain damage (the most common of these diseases is Alzheimer's disease) and to long-term irreversible deterioration in reasoning ability and brain function.

The initial symptoms of dementia include memory loss, cognitive deficits and orientation problems; the patient is gradually losing their capacity for activities of daily living and communication with other people. Quite often, patients may develop behavioral changes; ultimately, the patient’s condition deteriorates to complete loss of function.

Alzheimer's disease is the most common type of dementia, a condition where normal brain function becomes impossible. Alzheimer's disease causes problems with memory, thinking and behavior. At an early stage, the symptoms of dementia may be minimal; but as the disease exerts progressively heavier influence on the brain, the symptoms worsen. The rate of progression is individual for each person, but the average life expectancy after the diagnosis has been made is eight years.

Alzheimer’s disease is a neurodegenerative disease, which slowly but surely destroys brain cells. This is the most frequent type of dementia, which accounts for 60–65% of all cases of dementia. The disease got its name from the German neurologist Alois Alzheimer, who was the first to describe the symptoms and neuropathological signs of the disease, such as amyloid plaques and nodules in the brain in 1907. Alzheimer's disease affects memory and cognitive functions, which results in confusion, mood changes, and disorientation to time and space. The disease is non-communicable; it is more frequently diagnosed in people over 65 years of age; in significantly rarer cases,

an early onset Alzheimer’s disease is possible is substantially younger individuals.

While there is currently no treatment that can stop the progression of Alzheimer's disease, there are medications that can help relieve the symptoms of dementia. Over the past three decades, dementia research has provided a deeper understanding of how Alzheimer's disease affects brain function. Today, researchers continue to look for more effective treatments, as well as the measures that could prevent Alzheimer's disease and improve brain health.

Not all cases of memory loss are caused by Alzheimer's disease. If an elderly person is experiencing memory problems, a doctor should be consulted. If these symptoms are caused by a vitamin deficiency or by side effects of a drug, they can be reversed.

Memory loss and other symptoms of Alzheimer’s disease

Memory deficits and, in particular, difficulties recalling previously learned information are often the first signs of Alzheimer’s disease.

As we age, our brain may undergo certain changes, and older people may find it difficult to remember certain details. However, Alzheimer’s disease and other types of dementia cause memory loss and other serious symptoms, which hinder normal everyday functions. Such symptoms are not natural for the “usual” age-related changes.

In addition to memory loss, the symptoms of Alzheimer’s disease include the following:

- Problems completing the tasks that weren't previously difficult.
- Difficulties with problem-solving.
- Mood and character changes, distancing from family and friends.
- Problems with oral and written communication.
- Problems recognizing places, people and recalling the sequences of events.
- Changes in visual perception, such as difficulty interpreting images.

The family and friends may notice the symptoms of Alzheimer’s disease and other progressive dementias earlier than the individual who is experiencing those changes. If an individual is experiencing potential symptoms of dementia, it is important to conduct a medical examination in order to find out the cause.

Alzheimer's disease and the brain

Brain cells in the hippocampus (the region of the brain responsible for memory) are often the first ones to be affected by Alzheimer's disease. Therefore, memory loss and especially difficulties with recalling recently memorized information are usually the initial sign of the disease.

Risk factors of Alzheimer’s disease

Although we are still unaware of all the reasons why some people develop Alzheimer’s disease and some don’t, research studies help to have a better understanding of which factors are making a person more susceptible to the disease.

In this series of the research study, we have been investigating the following risk factors of Alzheimer’s disease in 56 individuals:

- Age (our study enrolled 3 patients with Alzheimer’s disease younger than 65 years and 53 patients with Alzheimer’s disease over 65 years of age).

- Having a family history of Alzheimer’s disease (in our study, there were 22 patients whose relatives had Alzheimer's disease, which confirmed the role of the genetic factor).

- History of moderate cognitive impairment, which tended to progress (in our study, there were 16 patients with Alzheimer’s disease who previously had moderate cognitive impairment, which tended to progress).

- Cardiovascular disease (in our study, there were 27 patients with Alzheimer’s disease who had cardiovascular disease).

- Smoking (our study enrolled 35 patients with Alzheimer’s disease who smoked).

- Being overweight (our study enrolled 41 overweight patients with Alzheimer’s disease).

- Diabetes (our study enrolled 12 patients with Alzheimer’s disease who were diagnosed with diabetes).

- Elevated cholesterol levels (our study enrolled 38 patients with Alzheimer’s disease who had elevated cholesterol levels).

- Increased blood pressure in middle-aged adults (our study enrolled 34 patients with Alzheimer’s disease who previously had increased blood pressure).

- Low education level (our study enrolled 37 patients with Alzheimer’s disease who had low education level).

- History of traumatic brain injury (our study enrolled 15 patients with Alzheimer’s disease who had history of traumatic brain injury).

- Sports activity in the past (there were 8 patients with Alzheimer's disease who previously engaged in sports and had head injuries).

- Participants in armed conflicts (in our study, there have been 4 patients with Alzheimer's disease, who previously participated in armed conflicts).

Table 3.1. Risk factors of Alzheimer’s disease

The risk factor	Number of cases in patients with confirmed disease	%
Age above 65 years	53 patients	94.6
Having relatives with Alzheimer’s disease	22 patients	39.3
Moderate cognitive impairment, which tended to progress	16 patients	28.6
Cardiovascular disease	27 patients	48.2
Smoking	35 patients	62.5
Being overweight	41 patients	73.2

Diabetes	12 patients	21.4
Elevated cholesterol levels	34 patients	60.7
Low education level	37 patients	66.1
History of traumatic brain injury	15 patients	26.8
Sports activity in the past	8 patients	14.3
Participants in armed conflicts	4 patients	7.1
Total	56 patients	100

Age. Advanced age is the main risk factor of Alzheimer's disease. Most people with Alzheimer's disease are not younger than 65 years.

Although infrequently, Alzheimer's disease (known as early-onset Alzheimer's disease) may begin before 65 years of age. The proportion of such patients is estimated at 5%. Quite frequently, manifestations of Alzheimer's disease in younger patients are diagnosed incorrectly.

Family members with Alzheimer's disease. If any of the patient's parents or siblings has or had Alzheimer's disease, they are at greater risk of having it compared to individuals with negative family history. Scientists do not have a complete understanding of the causes of familial Alzheimer's disease; it is possible that a role is played by genetic and environmental factors and lifestyle.

The genetic factors. Scientists have identified several genes whose mutations increase the risk of developing Alzheimer's disease. The e4 allele of the APOE gene is the most common gene of risk for Alzheimer's disease; it is estimated to have played a role in the development of the disease in about a quarter of cases.

Unlike the risk gene, the determining gene guarantees the development of the disease.

Only one case is known when Alzheimer's disease developed as a result of the inheritance of a determining gene. Alzheimer's disease that developed due to the presence of a determining gene is rare, i.e. in less than 1% of cases. The Alzheimer's disease caused by the presence of a determining gene is referred to as “autosomal dominant Alzheimer's disease” (ADAD).

Moderate cognitive impairment. The symptoms of moderate cognitive impairment include changes in the thinking process, but they do not interfere with activities of daily living and are not as serious as those in Alzheimer's disease or in other types of progressive dementia. Moderate cognitive impairment, especially when associated with memory problems, increases the risk for Alzheimer's disease and other types of dementia. However, moderate cognitive impairment are not always progressive. In some cases, they are reversible or remain at the same level.

Cardiovascular disease. Research studies demonstrate that brain health is directly related to cardiovascular health. With the blood, the brain receives oxygen and the nutrients required for its normal functioning and the heart is responsible for maintaining the blood flow to the brain. Therefore, the causative factors of cardiovascular disease may also be associated with the increased risk of Alzheimer's disease and other dementias. These factors include smoking, excessive weight/obesity, diabetes, high cholesterol and high blood pressure in middle-aged people.

Education level and Alzheimer’s disease. Research studies have established a correlation between fewer years of formal education and higher risk for Alzheimer’s disease and other dementias. Although there is no apparent reason for such correlation, some scientists believe that more years of formal education may likely help strengthen interneuronal connections, thereby allowing the brain to use alternative pathways to relay signals from one neuron to the other as a countermeasure to the changes caused by Alzheimer's disease and other dementias.

Head injuries. The risk for Alzheimer's disease and other dementias is increased as a result of moderate to severe traumatic brain injuries, such as an impact to the head or other cranial injuries, which lead to memory loss or loss of consciousness for more than 30 minutes. Up to 50% of all head injuries are caused by motor vehicle accidents. People who repeatedly have impacts to the head or other head injuries, e.g. athletes engaging in high-risk sports or participants in armed conflicts are also at high risk for dementia and impaired cognitive function.

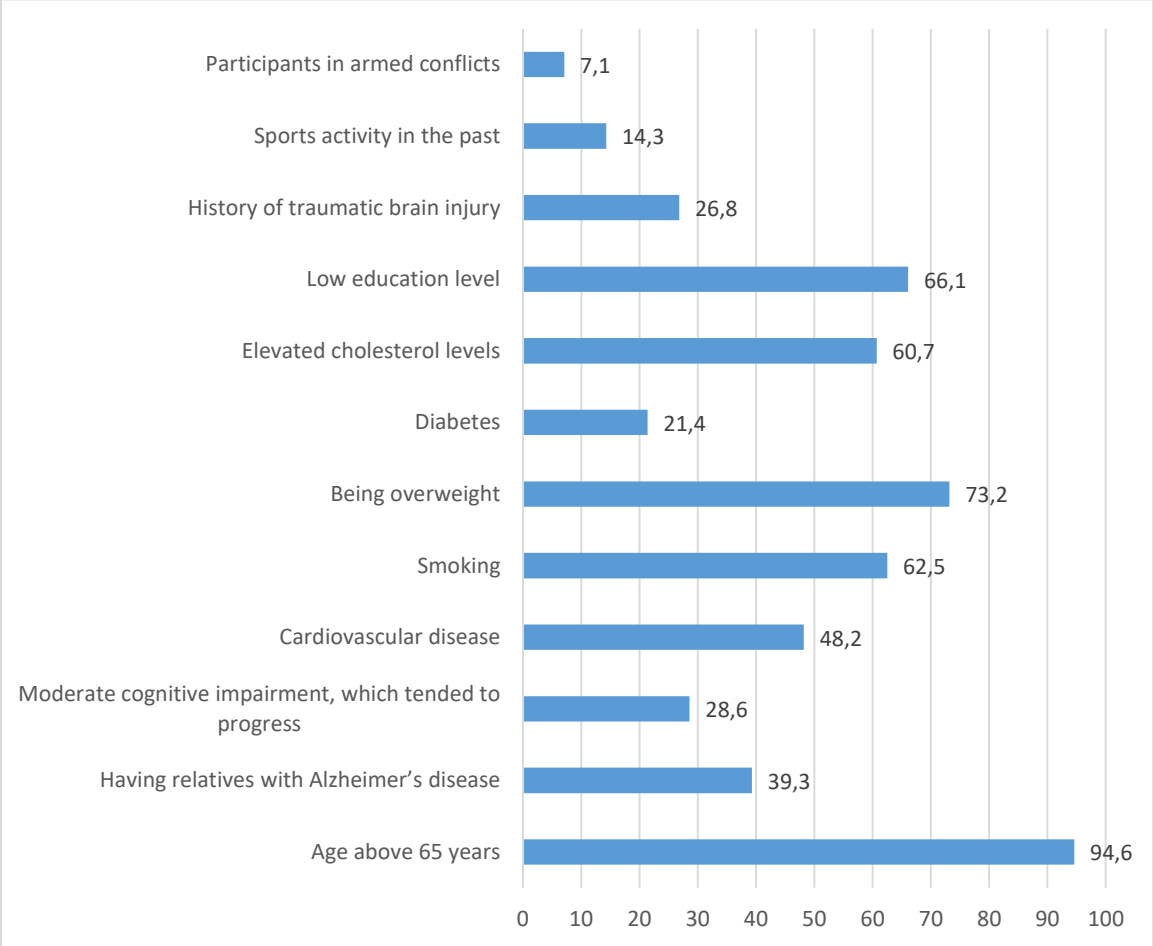

Figure 3.1. Risk factors of Alzheimer's disease (expressed as percentage)

Diagnosis of Alzheimer's disease. Unfortunately, modern Medicine does not possess a simple and unequivocal method to detect Alzheimer's disease. This diagnosis calls for a complete medical examination. Blood tests, cognition tests,

and brain imaging may be needed to determine the cause of the patient's symptoms.

Although the physician usually can determine the presence of dementia, it is often difficult to determine its type. Misdiagnosis is especially common in early-onset Alzheimer's disease.

It is important to make an accurate diagnosis as early as possible. This provides the following benefits:

- A higher likelihood that the patient will benefit from existing treatments that improve the quality of life
- An opportunity to get assistance from support services
- A chance to participate in clinical trials and studies
- An opportunity for the patient to express their wishes concerning future care and accommodation
- Time to take care of financial and legal issues
- Treatment and support in Alzheimer's disease

In order to diagnose Alzheimer's disease, the physicians may use the history of present disease, physical status tests, physical and neurological examinations, diagnostic tests and brain imaging.

More recently, professionals pay increasingly more attention to different types of dementia of the elderly, depending on clinical or diagnostic signs.

One of such types of dementia of the elderly is frontotemporal dementia (FTD), which is an umbrella clinical diagnostic category used to describe a number of dementia syndromes associated with the focal atrophy of the medial cortex, orbitofrontal cortex and anterior temporal lobes.

This type is characterized by an onset in younger patients; however, frontotemporal dementia is seen progressively more often in elderly patients. In spite of the fact that FTD is rarely seen in people older than 65 years, the prevalence of the disease in this age cohort may be higher than expected. This may be associated with a rare use of the required diagnostic technologies in

elderly patients, as well as with the low percentage of autopsies in older age groups.

The diagnosis of frontotemporal dementia is supported by the following clinical findings: impaired personal hygiene and self-care; mental rigidity and lack of mental flexibility; split attention and inability to stay focused for prolonged periods; stereotyped behavior; reduced speech production; speech stereotypy; eating behavior changes; echolalia; neuropsychological evidence for executive dysfunction in the absence of severe amnesia, aphasia and optical-spatial disturbances; normal EEG with standard measurement; predominant involvement of frontal and anterior temporal cortex when performing neuroimaging.

CHAPTER 4
THE SPECIFIC ASPECTS OF CLINICAL MANIFESTATIONS IN ALZHEIMER'S DISEASE AND OTHER TYPES OF DEMENTIA IN THE ELDERLY

In this series of the research study, we determined and studied the signs and symptoms of dementia of the elderly and Alzheimer's disease in 158 patients.

A memory loss that interferes with daily life may be a symptom of Alzheimer's disease or other dementia. Alzheimer's disease is a cerebral disease, which causes a slow deterioration of memory, thinking and reasoning skills.

There are 10 warning signs and symptoms of dementia of the elderly and Alzheimer's disease.

1 - Memory loss that disrupts daily life (this symptom was observed in all 158 patients, i.e. in 100%).

One of the most common signs of Alzheimer's disease, especially at an early stage, is forgetting recently learned information. Other signs include forgetting important dates or events, repeating the same questions over and over again, and an increasing reliance on memory aids (such as reminders, notes and/or electronic devices) or on family members to deal with the things that the patient used to manage independently.

This is in contrast to typical age-dependent memory changes, when the person may occasionally forget names or appointments, but recalls them later.

2 - Challenges in planning or solving problems (this symptom was observed in 142 patients, i.e. in 89.9%).

Some people living with dementia may experience changes in their capacity to develop and follow a plan, or to work with numbers. They may have trouble following a familiar recipe or keeping track of monthly bills. They may have difficulty concentrating and it may take much longer to do something than before.

This is in contrast to typical age-dependent changes, when the person may make occasional errors with finance management or with household bills.

3 - Difficulty completing familiar tasks at home, at work, or at leisure (this symptom was observed in 119 patients, i.e. in 75.3%).

People with Alzheimer's disease often struggle with activities of daily living. Sometimes, they may have trouble commuting to a familiar place, with making a shopping list or with remembering the rules of a favorite game.

Unlike typical age-related changes, a person sometimes needs help to use a microwave oven or to record a TV show.

4 - Confusion in time or place (this symptom was observed in 78 patients, i.e. in 49.4%).

People living with Alzheimer's disease may forget dates, seasons, and the flow of time. They may have trouble understanding something unless it happens immediately. Sometimes they may forget where they are or how they got there.

This is in contrast to typical age-dependent changes, when the person may confuse the days of the week, but finds out later.

5 - Trouble understanding visual images and spatial relationships (this symptom was observed in 85 patients, i.e. in 53.8%).

In some people, problems with vision are a sign of Alzheimer's disease. This can lead to balance or reading problems. They may also have trouble judging distance and detecting color or contrast, which impairs their ability to drive.

This is in contrast to typical age-dependent changes, e.g. visual changes due to a cataract.

6 - New problems with words in speaking or writing (this symptom was observed in 67 patients, i.e. in 42.4%).

People living with Alzheimer's disease may experience difficulties following or joining a conversation. They may stop in the middle of a talk and have no clue how to continue, or they may repeat themselves. They may have

vocabulary problems, trouble naming a familiar item, or using the wrong name (e.g., calling a clock a "wristwatch").

This is in contrast to typical age-dependent changes, when a person may have occasional difficulties with finding the right word.

7 - Misplacing things and losing the ability to retrace steps (this symptom was observed in 104 patients, i.e. in 65.8%).

A person living with Alzheimer's disease may put things in strange places. They may lose things and not be able to go back to find them again. He or she may accuse others of stealing, especially as the disease progresses.

This is in contrast to typical age-dependent changes, where a person may lose things from time to time, but retrace steps to find them.

8 - Decreased or poor judgment (this symptom was observed in 139 patients, i.e. in 87.9%).

People may experience changes in their judgment or decision-making. For example, they may be short-sighted when dealing with money, or pay less attention to personal care or cleanliness.

This is in contrast to typical age-dependent changes, where a person may occasionally make bad decisions or mistakes, e.g. neglecting oil change in their car.

9 - Withdrawal from work or social activities (this symptom was observed in 123 patients, i.e. in 77.8%).

A person living with Alzheimer's disease may experience changes in their ability to maintain or follow a conversation. As a result, he or she may withdraw from hobbies, social activities, or other pursuits.

This is in contrast to typical age-dependent changes, where a person may sometimes feel disinterested in their family or social obligations.

10 - Changes in mood and personality (this symptom was observed in all 158 patients, i.e. in 100%).

People living with Alzheimer's disease may experience changes in mood and personality. They may become confused, suspicious, depressed, frightened, or anxious.

This is in contrast to typical age-dependent changes, where a person may become irritated when their usual situation changes.

If a nurse has noticed one or more of these signs in a patient, this suggests a serious health problem to be assessed by the physician, and it is important to take action to find out what is happening.

Table 4.1. Estimation of the frequency of warning signs and symptoms of dementia of the elderly and Alzheimer's disease.

Signs and symptoms	Number of patients with the sign/symptom	%
Memory loss that disrupts daily life	158	100
Challenges in planning or solving problems	142	89.9
Difficulty completing familiar tasks at home, at work, or at leisure	119	75.3
Confusion in time or place	78	49.4
Trouble understanding visual images and spatial relationships	85	53.8
New problems with words in speaking or writing	67	42.4

Misplacing things and losing the ability to retrace steps	104	65.8
Decreased or poor judgment	139	87.9
Withdrawal from work or social activities	123	77.8
Changes in mood and personality	158	100

We have also determined the main differences between Alzheimer's disease and typical age-dependent changes (Table 4.2).

Table 4.2. The main differences between the symptoms in Alzheimer's disease and in typical age-dependent changes

The signs of Alzheimer’s disease and dementia	Typical age-dependent changes
Poor judgment and decision-making	The person may experience intermittent difficulties with decision-making or occasionally make a bad decision
Inability to manage budget	Skips monthly payments
Loss of ability to determine the date or season	The person may forget what day it is today, but recalls later
It is difficult for the patient to carry on a conversation	The subject may forget which word to use, but recalls the right word later
Misplacing things and being unable to locate them	Losing or misplacing things from time to time

The clinical manifestations and the underlying morphological changes in the brain of patients with frontotemporal dementia (FTD) are heterogeneous. In a broad sense, two principal abnormalities have been identified in patients with FTD. The first is notable for progressive social role functioning impairment and personality changes, known as the behavioral variant of the disease; the second is notable for gradual disintegration of the speech function known as progressive aphasia. The latter is in turn subdivided according to the mechanism of aphasia-related disturbances into progressive aphasia with impaired fluidity and semantic dementia.

The FTD syndrome may be clinically and pathomorphologically associated with motor neuron disease, as well as with a number of extrapyramidal motor diseases. Approximately 10% of subjects with FTD have clinical and neurophysiological manifestations of motor neuron disease; in turn, the same number of patients with this condition demonstrate behavioral and/or aphasic disorders sufficient for making a diagnosis of FTD. Of the diseases that are comorbid to FTD, the most frequent ones include corticobasal degeneration and progressive supranuclear palsy.

Ground-breaking changes in understanding the mechanisms of neuronal death in FTD have been introduced by the immunohistochemical study methods. It has been found that neurons in 40% of individuals with frontotemporal lobar degeneration were accumulating tau protein or microtubule-associated tau protein. This variant of frontotemporal lobar degeneration was called tau-positive (FTLD-tau). Its occurrence was found to be associated with a mutation in the microtubule-associated tau protein gene.

The remaining cases of frontotemporal lobar degeneration are tau-negative.

At present, deciphering the molecular mechanisms of neuronal death in FTD is beginning to be used to verify the diagnosis. There are first reports of an increase in TDP-43 in the cerebrospinal fluid of patients with FTD and motor neuron disease. There is emerging evidence that plasma TDP-43 may have

cerebral origin. In addition, the possible uses of neuroimaging markers are discussed. The future trend is to create a disease-modifying therapy.

More than 40% of patients with FTD have a positive family history of dementia; at the same time, in most cases, these patients have other types of dementia. Patients with an autosomal dominant mode of inheritance account for only 10% of all FTD cases. Only 5-11% of subjects with FTD have mutations of the gene encoding microtubule-associated tau protein.

From a practical perspective, the above data allow recommending a thorough collection of family history whenever FTD can be suspected. It should also be remembered that the lack of clear evidence of FTD in the patient's relatives may be due to the fact that even quite recently, the diagnosis of this type of dementia was made extremely rarely. It is also necessary to take into account the family history of motor neuron disease, since in this clinical situation, cognitive testing is not routinely performed and concomitant FTD is therefore not detected. It is recommended to collect family history for evidence of progressive aphasic and corticobasal syndromes. In addition to that, clinical genetic counseling is recommended, with subsequent detection of mutations in the genes encoding microtubule-associated tau protein and granulin in patients whose first-line relatives had FTD or FTD spectrum disorders.

The clinical presentation of frontotemporal dementia. The onset of the disease mainly occurs within the age range from 40 to 70 years. The onset of symptoms after 80 years of age does not rule out the diagnosis of FTD, but makes it rather unlikely. The cases of this diseases with an onset before 40 years of age are extremely rare. FTD has an insidious and a steadily progressive course. The duration of the disease is from 8 to 10 years. Acutely developing symptoms suggest a different nature of the disease. Lack of symptom aggravation with time is also quite doubtful to support the diagnosis of FTD; however, there are documented cases with a very slowly unfolding clinical presentation. An important feature of FTD is a prolonged absence of neurological symptoms, with the exception of minor extrapyramidal disorders,

such as motor slowdown and stiffness in the muscles of the extremities. These manifestations are often obscured by intense cognitive and behavioral disorders. The presence of severe neurological disorders is evidence against the diagnosis of FTD. A notable exception is a combination of FTD and amyotrophic lateral sclerosis.

Clinical criteria of the behavioral variant of frontotemporal dementia are as follows:

- insidious onset and gradual progression of the disease;
- early declines in the social sphere and interpersonal relationships;
- early dysregulation of personal behavior;
- early emotional decline;
- early loss of insight/awareness of one's disorder.

The family of people with the behavioral variant of frontotemporal dementia may report changes in the patient’s character and a decay in the social dimension of their life, mostly regarding socially acceptable conduct and ethical standards. The patient may display apparent social disinhibition, such as vagrancy, and making obscene comments and jokes about others. However, a reverse presentation may be seen. The patient may become apathetic, unmotivated, neglecting of their personal hygiene and may need to be reminded to wash themselves or to change their clothes. At the advanced stage of the disease, the patients may have urinary and fecal incontinence, of which they are not aware.

A frequent symptom is loss of emotional response to the care, affection and empathy with regards to family and significant others. A characteristic feature is a lack of a sense of embarrassment. Patients appear to be unperturbed by any difficulty.

Repetitive and stereotyped behavior is considered pathognomonic. These may include simple motor stereotypies, such as repeated rubbing of hands and/or tapping feet, as well as complex behavioral acts, such as humming the same tune all the time, picking up useless items, performing monotonous rituals, etc.

Eating disorders include gluttony and changes in dietary preferences, mostly towards sweet foods. Excessive alcohol consumption may be observed, which frequently confounds the correct diagnosis. Smokers often increase the number of cigarettes they smoke. In the late phases of the disease, patients may taste and eat inedible items.

In some patients, there is a significant decrease of response to pain. For example, the patient drinks very hot drinks, plunges into a very hot bath, and does not pull the limb off in response to a painful stimulus.

In patients with the behavioral variant of frontotemporal dementia, cognitive symptoms are less important than behavioral ones. The patients commonly have severe deficiencies in judgment, decision-making and insight. Business-related problems arise due to poor organization, management or ill-conceived decisions. Such patients often become victims of fraud. The patients with are often described as uncommunicative. They stereotypically use their favorite words or expressions; less common manifestations include misuse of words (verbal paraphasias). Memory impairment can be variable. Optical-spatial disturbances are usually absent. Subjects with the behavioral variant of frontotemporal dementia may have no problems finding their way around, i.e. have normal orientation to space and topographic memory.

Observation of the patient’s behavior is playing a key role in this study. Patients may appear emotionally flattened and poorly involved in various forms of social relationships, but more often intellectually challenged and puerile. Even if they are aware of their symptoms, the emotional response to the symptoms is superficial and lacking any significant concerns.

At the same time, it is worth mentioning that executive dysfunction, especially when severe, may have a significant impact on performance in other neuropsychological domains during the tests. This is especially true for patients who are apathetic, who have significant impairment of attention, and are abnormally distracted.

In order to distinguish frontotemporal dementia from Alzheimer's disease, we have used data regarding some aspects of performance on neuropsychological tests by patients with frontotemporal dementia, which can help in the differential diagnosis of these two diseases.

The specific aspects of neuropsychological test performance in patients with frontotemporal dementia:

1. Minimal effort when performing the tasks, i.e. the patient often uses the "I don't know" answer.

2. Poor endurance, i.e. the patient is prompt to quit the task.

3. Impulsive responses, i.e. the patient begins to complete the task without listening till the end of the instruction; in multiple-choice tests, they choose an answer without considering other options.

4. Insufficiency of comparison, i.e. the patient does not check the correctness and accuracy of task performance (for example, a drawing).

5. Insufficient commitment to the goal of the task, i.e. the patient ignores the conditions of the task (for example, instead of copying a shape, they may add their drawing to the sample or draw it inside the existing sample).

6. Distractibility, i.e. the patient comments on stimuli that are not related to the task (for example, steps in the corridor).

7. Concreteness/egocentricity - the patient gives personalized answers to general questions (for example, the question: “Is it easy to eat meat with a spoon?” Answer: “No, I am a vegetarian”).

8. Stereotypies, i.e repetitive use of “stock phrases”.

9. Perseveration, i.e. the patient repeats an action or a task after it has been completed.

10. Insufficient care about task completion, i.e the outcome of the task does not bother the patient.

11. Fatigue, i.e. the patient avoids completing the task or makes attempts to quit.

The specific aspects of memory in frontotemporal dementia. The patient's family often report memory impairment as one of the key symptoms of frontotemporal dementia. At the same time, these patients rarely have severe amnesic disorders. They are usually properly oriented. During the conversation, the therapist may identify the information of interest to the patient, which the patient has remembered in a recent past (e.g., the scores of their favorite football team).

In cognitive testing, memory impairment usually has "frontal" characteristics. Task performance is especially impaired when performing active recall tests, such as retelling a story. In this case, performance can be improved by offering hints and multiple choices, which indicates a relatively good retention of the memorized information.

In some cases, the patient may have substantial problems with recalling information even when multiple choices are offered. This happens with severe executive dysfunctions, such as gross attention disorders, abnormal distractibility, impulsive answers without verification, and lack of purposefulness in actions (the patient chooses an option not because they have seen/heard it before and remembered, but simply because they like it better).

Neuroimaging in frontotemporal dementia. A common characteristic sign of FTD is atrophy of the frontal and anterior temporal cortex as found on structural MRI.

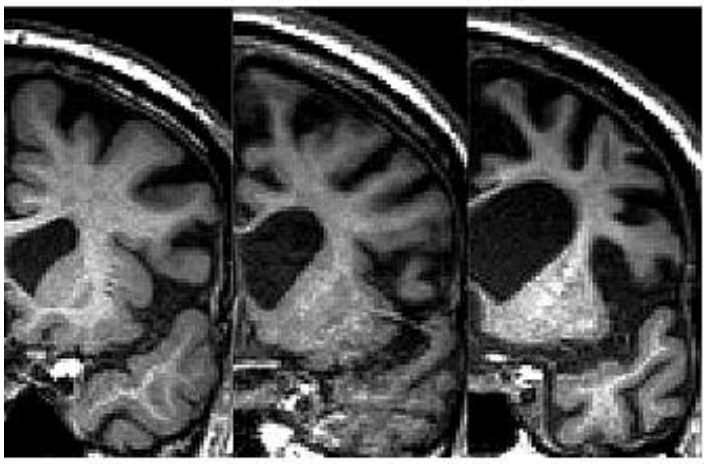

Figure 4.1. MRI evidence of escalating atrophy of prefrontal cortex in frontotemporal dementia

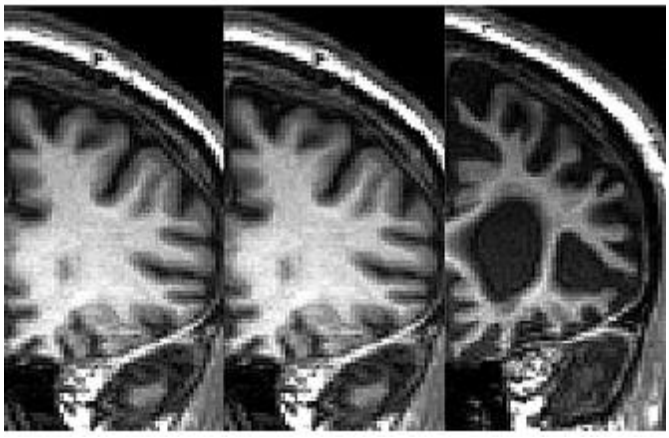

Figure 4.2. MRI evidence of escalating atrophy of orbitofrontal cortex in frontotemporal dementia

In a number of patients, this atrophy is associated with an atrophic process in the region of the basal ganglia. Coronal sections reveal atrophy of medial frontal cortex, orbitofrontal cortex and anterior parts of the insula (Figures 4.1, 4.2.). In the early stages of the disease, especially in its behavioral variant, changes on routine MRI may be absent.

At present time, FTD has been demonstrated to have a more rapid course than AD. The factors that reduce life expectancy in people with FTD include comorbid motor neuron disease.

CHAPTER 5
THE TREATMENT OF ALZHEIMER'S DISEASE AND OTHER TYPES OF DEMENTIA IN THE ELDERLY: MODERN OPTIONS AND PROSPECTS

Although there is currently no treatment which could slow down or stop the effects of Alzheimer’s disease on the brain, there are medications that can provide a temporary relief of dementia symptoms in selected patients. The effects of such drugs are based on increasing the amounts of neurotransmitters in the brain.

The researchers continue to explore methods to improve the treatment of Alzheimer's disease and other types of progressive dementia. Tens of treatments are currently in the development stages, as well as pharmacological studies aimed at prevention of brain cell decline in Alzheimer’s disease.

In addition, the availability of support services and the use of non-pharmacological behavioral interventions can improve the quality of life of people with dementia, as well as of their families and caregivers. The latter include the following:

- Treatment of comorbidities
- Coordination of patient care between different health professionals
- Participation in activities that contribute to improved mood
- Behavioral intervention (to help manage the most common behavioral changes such as aggression, sleep disorders and anxiety)
- Addressing knowledge deficits concerning the disease
- Creating a team to support the patients
- Care

Caring for a person suffering from Alzheimer's disease or other dementia can be a rewarding but demanding task. In the early stages of dementia, the person may remain independent and require little care. However, as the disease

progresses, the need for care will increase, and eventually round-the-clock assistance will be required.

Nurses often hear from relatives and caregivers that the most annoying aspect of Alzheimer's disease is the behavioral changes that it causes. There are many resources available that help caregivers know what to expect and how to adapt to changes in the early, moderate, and advanced stages of the disease.

A special place in the problems concerning Alzheimer's disease belongs to treatment, which, despite advances in understanding the pathogenesis of the disease, remains insufficiently effective and requires further development of active drug substances, taking into account the possibility of symptomatic, disease-modifying and preventive therapy.

To date, five cholinesterase inhibitors, memantine (a noncompetitive antagonist of NMDA receptors), ginkgo biloba extract and cerebrolysin have some level of approved marketing for the treatment of Alzheimer's disease in North America, Europe, Australia, New Zealand, and Japan. Risperidone also has a confirmed level of use in some European countries for the treatment of agitation in Alzheimer's disease, while the rationale for the use of antipsychotics in Alzheimer's disease has not been demonstrated.

Tacrine, donepezil, rivastigmine, and galantamine are the cholinesterase inhibitors approved for use in the US. At least one of the cholinesterase inhibitors, and more often two, are approved for the treatment of Alzheimer's disease in the national formularies of most European countries.

And yet, as of today there are no proven drugs to cure Alzheimer's disease or to prevent its occurrence and development. The two FDA-approved drug classes for AD symptoms include cholinesterase inhibitors and N-methyl-D-aspartate (NMDA) receptor antagonists.

Cholinesterase inhibitors and NMDA receptor antagonists can be used both as monotherapy and in combination therapy.

There are some differences in the guidelines and recommendations concerning the use of these drugs. For example, the American Psychiatric

Association and the American Geriatric Psychiatry Association recommend cholinesterase inhibitors for the treatment of mild to moderate Alzheimer's disease, and NMDA receptor antagonists for severe Alzheimer’s disease.

The UK National Institute for Health and Clinical Excellence, which prepares instructions for the National Health Service, recommends the exclusive use of cholinesterase inhibitors, while NMDA receptor antagonists are recommended for use only in clinical trials due to their high cost and limited efficacy.

The cholinergic treatment of Alzheimer's disease is based on the so-called cholinergic hypothesis. The latter is based on cholinergic deficiency, which is responsible for the cognitive and behavioral changes in patients with Alzheimer’s disease. Consequently, an increase in central cholinergic neurotransmission leads to improvements in cognitive and behavioral functions. Th support for the cholinergic hypothesis includes the following factors: a decrease found in cholinergic basal brain projections; significant loss of cholinergic cells in the nucleus basalis; reduced activity of choline acetyl transferase, necessary for the synthesis of acetylcholine; correlations between choline acetyl transferase or neuronal loss in the basal ganglia and the plaques containing Ab protein, and associations between cholinergic deficiency and decreased performance on cognitive tests.

The three principal cholinergic approaches to the therapy of Alzheimer’s disease may include using a precursor drug, as well as using direct cholinergic agonists and cholinesterase inhibitors. The efficacy of the former two lacks clinical confirmation, and the rationale for their use is still a subject of debate. The potential role of muscarinic receptor agonists and nicotinic receptor modulators in the treatment of Alzheimer's disease is discussed below.

Despite the fact that other neurotransmitter systems are involved in the abnormal process in Alzheimer's disease, intervention with cholinesterase inhibitors remains one of the main approaches for the treatment of Alzheimer's disease at various stages.

Cholinesterase inhibitors such as donepezil, rivastigmine and galantamine are recommended for the treatment of mild to moderate AD; only donepezil is recommended in severe AD. These drugs bind reversibly to acetyl cholinesterase, which allows for an increase in the concentration of acetylcholine, a neurotransmitter associated with thinking, learning, memory and other cognitive processes. Tacrine, the first FDA-approved drug for the treatment of AD, is currently not recommended for use in medical practice due to its high risk of hepatotoxicity and drug interactions requiring frequent monitoring.

The main differences between modern cholinesterase inhibitor drugs include their availability, drug interactions, and side effect profiles. The most common adverse events in this class are gastrointestinal disturbances such as nausea, vomiting, and diarrhea.

A new and promising trend in the treatment of Alzheimer's disease is immunotherapy.

Vaccination against AD can stimulate cellular and humoral immune responses to generate anti-Ab antibodies that facilitate removal of Ab from the CNS. One such vaccine is AN-1792.

In order to minimize T cell activation, passive immunization, or direct administration of anti-Ab antibodies, is used. Phase 3 clinical trials of monoclonal antibodies to Ab are currently underway. Non-specific passive immunization (intravenous immunoglobulin), which includes natural polyclonal antibodies to donor Ab immunoglobulins, is the latest research trend in the field of immunotherapy for Alzheimer's disease. A Phase 2 clinical trial has demonstrated a reduction in total Ab levels and stabilization of cognitive functions.

The incidence of Alzheimer's disease is predicted to increase rapidly over the next 30 years, leading to significant increases in therapy-associated costs and in the problems associated with care for such patients. Thus, the development of effective treatment, taking into account its economic component, is of great

importance. A number of current guidelines recommend the use of cholinesterase inhibitors in the early and moderate stages of Alzheimer's disease, and NMDA receptor antagonists in severe disease. At the same time, the results of various studies suggest the possibility of using these two groups of drugs at different stages of the disease.

There is still a great need to increase awareness of the diagnosis of Alzheimer’s disease taking into account the various stages of cognitive impairment (including the Alzheimer's type syndrome of moderate cognitive impairment), potential treatment options at various stages of the disease, as well as the specific aspects of care for patients with pronounced impairment of cognitive functions. Therapy should be customized taking into account the effectiveness, the tolerability, the ease of use of drugs and their costs.

It is also important to implement non-pharmacological interventions along with the use of drugs in order to improve the effect of the therapy and to achieve other goals aimed at by the physicians and caregivers. Many of these goals include maintaining the levels of cognitive and functional activity of patients, as well as improving the quality of life for both patients and their caregivers. Non-pharmacological interventions in this case include various types of mental and physical activation, keeping a balanced diet (if possible, a Mediterranean diet), and controlling stress levels. Special attention should be paid to the contribution of risk factors to the development of Alzheimer's disease, in particular hypertension, hyperglycemia, hypercholesterolemia, smoking, stress, etc.

As for frontotemporal dementia, there are currently no specific therapeutic interventions for this type of dementia. Respectively, the treatment approaches, both pharmacological and non-pharmacological, are aimed at reducing symptoms that cause the greatest amount of suffering. The role of drug treatment remains unclear.

High-quality studies that evaluated the efficacy of therapies in frontotemporal dementia have been scarce, in small patient samples, and with often ambivalent results. There have been efficacy studies of selective serotonin

reuptake inhibitors for disinhibition in patients with frontotemporal dementia, however, the investigators have not come to an unambiguous conclusion regarding their effectiveness.

Atypical antipsychotic drugs, in particular olanzapine, are used in clinical practice to relieve severe agitation, aggressive behavior, or psychotic disorders. Drugs are under development that affect a number of fundamental abnormal processes in frontotemporal dementia, including aggregation of tau protein and TDP-43.

A significant attention in modern research is given to health problems in persons caring for patients with frontotemporal dementia. The level of distress associated with care for patients with frontotemporal dementia is higher than that in case of Alzheimer's disease.

Caregiver distress in frontotemporal dementia was found to be more dependent on the severity of behavioral disorders rather then on the severity of cognitive decline.

Depression is by far the most common disorder among caregivers of this patient population. It incidence reaches approximately 58%. Corrective approaches to distress are now based on educational approaches, i.e. teaching caregivers to understand and deal with the behavioral disorders and other disorders seen in frontotemporal dementia.

In order to assess the capabilities and problems of the health care personnel, we have used a modified health care personnel questionnaire (a total of 57 nurses have taken part).

In this study series, we have used Dementia Attitudes Scale (DAS-GR) [28] in order to investigate the attitude of health care personnel towards patients with dementia and Alzheimer's disease (AD).

The healthcare personnel were offered to answer in the affirmative (“Yes”) or in the negative (“No”) to the following questions:

I feel at ease among people with Alzheimer's disease (AD)

I don't feel comfortable being around people with AD

I'm afraid of people with AD

I can't imagine caring for someone with AD

I would avoid an agitated person with AD

I feel confident among people with AD

I see no problem touching people with AD

I’m not very familiar with AD

I am disappointed because I don’t know how to help people with AD

It is possible to enjoy interaction with people with AD

I admire the ability of people with AD to cope with their difficulties.

People with AD can be creative

It is important to know the past history of people with AD

People with AD can enjoy life.

We can do a lot now to improve the lives of people with AD

People with AD like to have familiar things nearby

Difficult behavior can be a form of communication for people with AD

People with AD can feel when others are kind to them

Every person with AD has different needs

I enjoy working with people with AD

After the test was complete, we have analyzed the results using Dementia Knowledge Assessment Tool (DKAT2-GR).

The healthcare personnel were offered to answer in the affirmative (“Yes”) or in the negative (“No”) to the following questions concerning their knowledge of dementia.

The first block consisted of questions where the correct answer was "Yes", while the second block consisted of questions where the correct answer was "No", i.e. elements with reverse assessment.

All these questions were suggested to healthcare personnel as part of one questionnaire, after which they had the opportunity to review their answers and get additional education about Alzheimer's disease and other types of dementia in the elderly.

Table 5.1. Analysis of healthcare personnel's knowledge concerning dementia of the elderly and Alzheimer's disease with a tentative affirmative reply to the question

Statements	"Yes" answers	"No" answers
Dementia develops due to changes in the brain	54	3
Brain changes are often progressive	46	11
Dementia may be caused by vascular disorders	38	19
This disease cuts life expectancy short	47	10
Families may help understand the needs of the patient	35	22
Problems with visual perception may develop	31	26
Unusual behavior of the patient is possible	53	4
Difficulty swallowing in later stages	32	25
The patient's movement is limited in later stages	37	20
Patients with dementia may sometimes benefit from exercise	32	25

Table 5.2. Analysis of healthcare personnel's knowledge concerning dementia of the elderly and Alzheimer's disease with a tentative negative reply to the question

Statements* * Elements with reverse assessment	"Yes" answers	"No" answers
Dementia develops only in elderly people	35	22
Knowing the probable cause helps predict the outcome	26	31
Urinary incontinence is always in the early stages	24	33
Changing the environment doesn't really change anything	41	16
It is important to correct the patient at all times	36	21
It is impossible to know whether the patient has pain or any other symptom	34	23

The results have demonstrated that not all the nurse respondents had good awareness of dementia and its manifestations. By reviewing their answers, they have received a lot of new information about Alzheimer's and other types of dementia in the elderly, which will likely improve the quality of care services they are providing.

A serious problem for people with dementia and their caregivers is getting lost when unaccompanied or in an unfamiliar environment. Such behavior often suggests wandering.

Wandering was defined as “a syndrome of dementia-associated movement behavior that has a repetitive, frequent, temporarily disoriented pattern that manifests as repetitive, random and/or walking patterns, some of which are associated with escape, escape attempts or loss, unless accompanied”.

It can be both aimless and goal-directed behavior, and its severity can be influenced by rhythm disturbances, spatial disorientation and visual perception disturbances, the physical and social environment, or changes in the personality and behavioral patterns of a person with dementia.

A more recent definition of wandering also includes critical wandering, a type of wandering that causes older people to run away while disoriented to time and place. Indeed, critical wandering exposes people with dementia to potential dangers, which is a source of concern for those who are taking care of them.

More than 60% of people with dementia are prone to wandering as the disease progresses. The consequences of wandering range from minor injury to the high costs associated with search and rescue operations and death. If a patient is not found within 24 hours, up to half of those who wander and get lost will sustain serious injury or die.

Wandering behavior also significantly affects the care and economic burden of family caregivers. For example, caregivers have been found to experience increased emotional stress. The severity of these consequences has attracted the attention of both caregivers and first responders, and raises questions about how the adverse effects associated with vagrancy in dementia patients can be managed and whether managing this behavior can have an impact on reducing the stressors that result from caring for a sick person with dementia.

Early interventions to control wandering included physical restrictions and medications; however, the use of such strategies is declining due to unwanted

side effects and negative consequences such as poor physical and social role functioning of the elderly patient.

High-tech strategies, such wearable GPS trackers, and low-tech strategies, such as visual barriers, suggest the options for risk reduction, which allows the person with dementia to have a certain degree of autonomy. Therefore, these strategies may be a preferable approach compared to restrictions and medications.

Modern technology can be used in helping patients with wandering, which can increase the time a person with dementia can live in the community and provide peace of mind to caregivers.

CONCLUSIONS

1. The authors have investigated the specific aspects of mental alterations in Alzheimer’s disease and other types of dementia in the elderly.
2. The authors have determined the most common risk factors for dementia of the elderly and Alzheimer's disease.
3. The authors have studied the specific aspects of development and diagnosis of Alzheimer’s disease and other types of dementia in the elderly.
4. The authors have investigated the specific aspects of clinical manifestations in Alzheimer’s disease and other types of dementia in the elderly.
5. The authors have investigated and determined the modern options and prospects of various methods of treatment of Alzheimer’s disease and other types of dementia in the elderly.

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