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## EVALUATION OF THE STATE OF PHARMACEUTICAL SUPPLY OF PATIENTS WITH DEMENTIA WITH ALZHEIMER DISEASE IN UKRAINE IN ACCORDANCE WITH INTERNATIONAL RECOMMENDATIONS

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**The aim:** to assess the state of pharmaceutical provision of patients with dementia in Alzheimer's disease in Ukraine in accordance with international recommendations.

**Materials and methods.** In our studies, we used data from international guidelines, clinical protocols that regulate the organization of medical and pharmaceutical care for these patients in the USA, Australia, Japan, Germany, Great Britain, Finland, India, Kazakhstan, and Ukraine. The actual state of pharmaceutical provision of these patients in Ukraine was studied using a depersonalized database of medical prescriptions, which operates based on a number of specialized healthcare institutions. In addition, data from the Morion information search system were used. We used general theoretical (historical, formal, graphic, hypothetical-deductive, etc.) and applied (clinical-economic, organizational-economic, mathematical-statistical, etc.) research methods.

**Results.** It has been established that a consolidated opinion has been formed in the world scientific community regarding the possibility of effective use in the pathogenetic treatment of patients with dementia in Alzheimer's disease of drugs from the groups N06DA Acetylcholinesterase inhibitors and N06DX-Other drugs for use in case of dementia. Thus, the pharmaceutical component of international recommendations, clinical protocols for the treatment of patients with dementia in Alzheimer's disease contains four drugs used in pathogenetic therapy. These are N06DA02 Donepezil, N06DA03 Rivastigmine, N06DA04 Galantamine and N06DX01 Memantine. It has been reported that all the above drugs are included in the domestic clinical protocol for the treatment of patients with dementia in Alzheimer's disease, the State Drug Formulary (with the exception of N06DA03 Rivastigmine), and the State Drug Registry. At the same time, all of them were absent from the National List of Essential Drugs, which has an important socio-economic and medical-pharmaceutical significance in the health care system. It was found that patients (200 people) received 2487 prescriptions (100.0 %), among which 9.41 % (234 prescriptions) were drugs used in pathogenetic treatment. There is a highly disproportionate nature of the distribution of prescriptions and consumption by international generic names of drugs. Thus, drugs N06DX01 Memantine accounted for 80.41 % (188 prescriptions) of all prescriptions in the group N06D Drugs for use in dementia, and the consumption rate was UAH 84420.20, which accounted for 91.48 % of the amount of expenses directed to patients with carrying out pathogenetic treatment. Significant dominance of drugs N06DX01 Memantine in the structure of prescriptions and consumption indicates the presence of severe, advanced forms of dementia in patients. This fact once again emphasizes the need for early detection and treatment of cognitive impairment, primarily for the rational use of limited health care resources. We have found that there are no prescriptions for N06D A04 Galantamine preparations, which are recommended by the relevant international recommendations in different countries of the world, as well as by the domestic clinical protocol for the pathogenetic treatment of mild and moderate forms of Alzheimer's disease. At the same time, N06DA05 Ipidacrine preparations were used in the treatment of domestic patients, which are not presented in the pharmaceutical component of international recommendations and protocols governing the pathogenetic treatment of the above-mentioned groups of neuropsychiatric patients.

**Conclusions.** The peculiarities of the formation of the pharmaceutical component in the organization of the treatment process of patients with dementia in Alzheimer's disease in Ukraine, established by us, allow further research on the development of rational ways of resource provision of neuropsychiatric patients

**Keywords:** dementia, clinical and economic analysis, drug consumption, pharmaceutical provision of neuropsychiatric patients, Alzheimer's disease

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### 1. Introduction

Population aging processes are an objective reality that affects almost all spheres of social life. The increase in

the number of elderly people in the general population of many countries of the world, including in Ukraine, as well as the increase in society's demands for people's quality of

life became a powerful trigger for a fundamental review of the issues of providing affordable medical care to patients with various forms of dementia. A special place in solving this issue is given to the organization of effective pharmaceutical support for patients with dementia, including those forms that develop because of Alzheimer’s disease (AD) [1, 2]. According to foreign literary sources, it could be stated that AD is the most common in the structure of various forms of dementia [3, 4]. According to the Alzheimer’s Association, approximately 60.0–80.0 % of all cases of neurological diseases are caused by AD [5, 6]. According to other data, AD occurs in approximately 90.0 % of patients with dementia [7, 8]. At present, approximately 24 million people suffer from AD dementia in the world, and by 2050 it is expected to increase fourfold. This is connected, first, with a 3-fold increase in the number of people over 65 years old, so compared to the data of 2010, their number will reach more than 1.5 billion people [7, 9].

From a medical and social point of view, AD is devastating for patients, and from the point of view of direct and indirect medical costs aimed at their treatment, it is unattainable even for the health care systems of economically developed countries. Thus, according to 2017 data in the USA, the average annual cost of providing medical care and appropriate pharmaceutical support for a patient over 65 years of age with various forms of dementia, including due to the development of AD, was 48,000 USD, which was 3.5 times more than for all other patients from the specified age group of the population [10, 11].

AD is characterized by an irreversible development of the pathological process, as well as a progressive functional, cognitive, and behavioural loss for the individual [12, 13]. Usually, dementia in AD is accompanied by a whole complex of various mental and behavioural disorders, primarily such as amnesia, agnosia, apraxia, and aphasia [14, 15]. Unfortunately, currently dementias that develop in AD are incurable [16, 17]. Pharmacotherapy of patients with AD dementia, which has a pathogenetic direction, is today the only active method of their treatment and elimination of behavioural disorders [18, 19].

At the same time, every year the urgency of finding and introducing new innovative drugs used in the treatment of dementia in AD is filled with not only socio-economic, but also financial content. Considering the prospective increase in the number of patients with dementia in AD, which is natural against the background of the general trend of aging of the population [6, 20], as well as taking into account the efforts of the state and society to satisfy the population’s demand for effective medical and social support of

such patients from health care institutions the issue of rational pharmaceutical provision of psychoneurological patients becomes important. The volume of sales on the pharmaceutical markets of countries characterized by strong potential, namely in the USA, France, Germany, Italy, Spain, Great Britain, Japan, and China, of drugs used in the pathogenetic treatment of cognitive disorders already in 2018 equalled \$2.2 billion, and in 2028 it is predicted (data of the company “GlobalData”) that their sale will be at the level of \$2.9 billion [21]. According to experts, the volume of sales of these drugs will have an average annual rate (%) of 19.3 % [21]. At the same time, as evidenced by the data of the company “Alzheimer’s Disease – Global Drug Forecast and Market Analysis to 2028”, the specified increase in sales of drugs used in the treatment of dementia in AD will be associated not only with an increase in the number of patients due to the aging of the population. It is expected that the planned growth of sales of these drugs will take place against the background of more active use of pharmacotherapy regimens containing new innovative drugs (Aducanumab from “Biogen”, BAN-2401 from “Eisai” and Gantenerumab from “Roche”) [22, 23].

Considering the consequences of the financial and economic and socio-economic crisis in Ukraine, as well as those objective processes associated with the aging of the population, the issue of finding models of rational resource provision for patients with dementia and AD is of great importance. The resolution of this issue becomes particularly relevant in the process of carrying out those reforms that have been introduced in the country since January 2022. Thus, since the beginning of the year, the “Programs of medical guarantees-2022” (further as a Programs) were introduced. Thus, as part of the implementation of this Program, packages of medical services were developed and implemented, the cost of which should be reimbursed by the state.

The purpose of the study is to assess the state of pharmaceutical support for patients with dementia in AD in accordance with international recommendations on the organization of pathogenetic pharmacotherapy.

**2. Research planning (methodology)**

To achieve the goal of the research, a plan was drawn up, which included several stages. According to their characteristics and content, they could be conditionally divided into three groups: general-organizational; effective and practical; final. The general characteristics of the stages of conducting research in their logical sequence of execution are given in Table 1.

Table 1

Characteristics and content of the main stages of research

Stage of the research	Analysis of content and characteristics of applied research stages
1	2
General organizational stage	
I stage of the research	Analysis of data from special literature for 5–7 years, cited in scientometric databases with the specified problem, as well as normative and legal documents, international recommendations and clinical protocols and guidelines, which regulate the issue of the organization of medical and pharmaceutical care for patients with dementia with AD in various countries of the world. Outline of the socio-economic and medical-pharmaceutical relevance of the research in the specified direction. Determination of those issues that are of primary importance in Ukrainian realities, especially against the background of solving the problems of rational use of limited health care resources

Continuation of Table 1

1	2
II stage of the research	Determination of the purpose, subject, objects, methods of research and elimination of possible limitations in conducting the analysis. Formation of the information and statistical base of research
Results applied stage	
III stage of the research	Analysis of the pharmaceutical component of international recommendations (professional associations of psychiatrists and neurologists), clinical protocols and guidelines for the organization of providing medical care to patients with dementia in AD in those countries characterized by significant achievements in the treatment of these groups of patients. Considering the Ukrainian realities, relevant recommendations, guidelines, clinical protocols or guidelines for the treatment of the specified groups of patients in countries such as India and Kazakhstan were additionally analyzed. The analysis of the pharmaceutical component in Ukraine was carried out according to the "Unified clinical protocol of primary, secondary (specialized), tertiary (highly specialized) and palliative medical care. Dementia", which was approved by the order of the Ministry of Health of Ukraine No. 736 dated 19.07.2016 (Further as clinical protocol) [24]. In order to assess the organizational and economic status of the drugs used in the pathogenetic treatment of the specified groups of patients, it was necessary to analyze the composition of the National List of Main Medicines, the State Register of Medicines and the State Formulary of the latest edition [25, 26]
IV stage of the research	According to the data of the depersonalized electronic database of drug prescriptions for patients with dementia with AD, who were treated in specialized health care institutions (SHCI) of Ukraine, conduct an analysis of the frequency of prescribing drugs that are used to eliminate cognitive functions and non-cognitive behavioural disorders of patients. To calculate the consumption of drugs used in the pathogenetic treatment of patients with dementia in AD and conduct its structural analysis at different levels of the ATC classification system. To determine the peculiarities in the formation of the pharmaceutical component of the organization of the therapeutic process of the pathogenetic direction in the specified groups of patients. To outline problematic issues in the formation of pharmaceutical support for the specified group of psychoneurological patients in accordance with the results of research that we received at the previous stage of research
Pre-final stage	
V stage of the research	Systematization and generalization of the obtained data. Design of graphic material. Formulation of conclusions that make it possible to assess the state of pharmaceutical support for patients with AD dementia in Ukraine in accordance with international recommendations and assess existing problems
VI stage of the research	Critical analysis of the obtained results to determine objective limitations in the interpretation of data, as well as in their practical use. Outline of the main directions of prospective research in the specified direction
VII stage of the research	Technical design of the material, writing of the article, checking the correctness of the design of literary sources, which are used during applied research

### 3. Materials and methods

The subject of the study is the state of pharmaceutical support for patients with dementia with AD in Ukraine. We include the following as the main research objects:

- special sources of information on the specified topic, presented by foreign and domestic authors;
- an information and statistical database, which presents data from regulatory documents, international recommendations, clinical protocols or guidelines that regulate the organization of medical and pharmaceutical care for patients with AD dementia in countries such as the USA, Germany, Australia, Japan, Great Britain, Finland, India, Kazakhstan, as well as leading world associations of neurologists and psychiatrists (Table 2);
- the pharmaceutical component of the corresponding Clinical Protocol (Ukraine), the National List of main medicines, the State Formulary of main medicines of the latest edition (14<sup>th</sup> edition) and the State Register of main medicines;
- electronic depersonalized database of medical prescriptions for patients (200 electronic registration forms) with AD dementia who were treated at specialized health care facilities in Ukraine;
- data from the Morion information and search analytical database by group of drugs used in the pathogenetic treatment of the patients we studied.

At the result-applied stage of research, we used two main approaches, namely formal and clinical-economic. At the III stage of research, we followed a formal approach, which involves the analysis of the existing legal framework, recommendations, clinical protocols, or guidelines adopted in various countries of the world and in Ukraine regarding the implementation of pathogenetic pharmacotherapy in the specified group of psychoneurological patients. The state of pharmaceutical support for patients with dementia with AD was studied (at the IV level) in Ukraine using methods of clinical and economic analysis (frequency analysis, structural analysis of drug consumption). To assess the intensity of drug prescriptions, we calculated the corresponding coefficient ( $K_i$ ). [27]. The specified coefficient is calculated according to the formula:

$$K_i = \frac{N}{n},$$

where  $N$  – the number of medicines appointments under the INN;  $n$  – the total number of medicines of drugs to patients.

The combination of these two approaches allowed, in our opinion, not only to assess the current state of the organization of pharmaceutical support for these patients in Ukraine, but also to outline ways to solve the problems of rational use of limited health care resources and pro-

viding the specified group of patients with affordable drugs. The calculation of drugs consumption was carried out in retail prices according to the information and search system “Morion”.

As we could see from the data in Table 3, a consolidated scientific opinion has been formed in the world regarding the use of four drugs in the pathogenetic treatment of patients with dementia in AD, three of which

Analysis of sources of information that were studied at the III level of research (results-applied stage) by country

Country or association of countries	The body or organization that developed and approved the relevant document. Name of the document	An active link to the relevant source of information
Countries of the Americas continent	American Psychiatric Association – APA. Treating Alzheimer’s Disease and Other Dementias. A Quick Reference Guide	<a href="https://psychiatryonline.org/doi/pdf/10.1176/appi.books.9780890426807">https://psychiatryonline.org/doi/pdf/10.1176/appi.books.9780890426807</a>
EU countries	Guidelines by the European Federation of Neurological Societies (EFNS)	<a href="https://www.academia.edu/16083320/Guidelines_by_the_European_Federation_of_Neurological_Societies_EFNS_subcommittee_for_Continuing_Medical_Education_CME_modification_2003_EFNS_approval_of_CME">https://www.academia.edu/16083320/Guidelines_by_the_European_Federation_of_Neurological_Societies_EFNS_subcommittee_for_Continuing_Medical_Education_CME_modification_2003_EFNS_approval_of_CME</a>
Australia	Department of Health and Aged Care. Clinical practice guidelines and principles of care for people with dementia	<a href="https://cdpc.sydney.edu.au/wp-content/uploads/2019/06/Dementia-Guideline-Recommendations-WEB-version.pdf">https://cdpc.sydney.edu.au/wp-content/uploads/2019/06/Dementia-Guideline-Recommendations-WEB-version.pdf</a>
Great Britain	National Institute for Health and Clinical Excellence (NICE).	<a href="https://www.nice.org.uk/guidance/TA217">https://www.nice.org.uk/guidance/TA217</a>
Japan	Center for Brain Science (CBS) <a href="https://www.riken.jp/en/news_pubs/research_news/pr/2021/20211109_1/index.html">https://www.riken.jp/en/news_pubs/research_news/pr/2021/20211109_1/index.html</a>	<a href="https://www.researchgate.net/figure/Approved-treatment-options-for-Alzheimers-disease_tbl1_325744910">https://www.researchgate.net/figure/Approved-treatment-options-for-Alzheimers-disease_tbl1_325744910</a>
USA	Food and Drug Administration (FDA)	<a href="https://www.alz.org/media/documents/fda-approved-treatments-alzheimers-ts.pdf">https://www.alz.org/media/documents/fda-approved-treatments-alzheimers-ts.pdf</a>
Finland	Duodecim (Finnish Scientific and Medical Society).	<a href="https://www.duodecimlehti.fi/haku/Alzheimerin%20taudin">https://www.duodecimlehti.fi/haku/Alzheimerin%20taudin</a>
Germany	The Association of the Scientific Medical Societies in Germany	<a href="https://www.awmf.org/uploads/tx_sz-leitlinien/038-013l_S3-Demenzen-2016-07.pdf">https://www.awmf.org/uploads/tx_sz-leitlinien/038-013l_S3-Demenzen-2016-07.pdf</a>
India	Indian Psychiatric Society Clinical Practice Guidelines	<a href="https://journals.lww.com/indianjpsychiatry/Pages/default.aspx">https://journals.lww.com/indianjpsychiatry/Pages/default.aspx</a>
Kazakhstan	Ministry of Health. “Clinical protocol for the diagnosis and treatment of dementia in Alzheimer’s disease”	<a href="http://www.rcrz.kz/docs/clinic_protocol/2015">http://www.rcrz.kz/docs/clinic_protocol/2015</a>

In general, it should be noted that during the research we used two groups of research methods, namely general theoretical (historical, formal, graphic, generalization, hypothetical-deductive, grouping, etc.) and applied (clinical-economic, organizational-economic, mathematical, and statistical, etc.) [28]. All the necessary statistical processing of the data used in the frequency analysis and in the calculations of the consumption of drugs was carried out with the help of the statistical analysis package Statistica (version 12.0, StatSoft, Tulsa, USA). A  $p$ -value<0.05 was considered as statistically significant.

#### 4. Research results

The results of the systematization of regulatory documents, international recommendations, clinical protocols, and guidelines governing the provision of medical care and pharmaceutical support for patients with AD dementia in different countries of the world are shown in Table 3.

belong to the group N06DA-cholinesterase inhibitors (N06DA02 Donepezil, N06DA03 Rivastigmine, N06DA04 Galanthamine) and one to the group N06DX-Other Dementia Uses (N06DX01 Memantine). The exception is only the data presented in the relevant clinical protocol approved in Kazakhstan. Thus, in Kazakhstan, in the case of pharmacotherapy of cognitive disorders of patients with dementia with AD, only two names of drugs are recommended for use, namely N06DA02 Donepezil and N06DX01 Memantine. In general, it should be noted that currently the issue of increasing the effectiveness of treatment of patients with dementia due to AD is very actively considered in foreign literature. Thus, research is conducted on a wide spectrum, primarily from the analysis of genetic predisposition of people [6, 18] to issues of early diagnosis [3, 4], pathogenesis of cognitive and non-cognitive behavioural disorders [7, 16]. Special attention is paid to the issues of early prevention of the occurrence of the specified mental disorders [6, 14] and effective treatment [12, 14] of various forms of dementia, including those resulting from the development of AD.

Subsequently, we analyzed the pharmaceutical component of the domestic Clinical Protocol and determined that in the pathogenetic treatment of cognitive disorders in mild and moderate stages of AD development, drugs from group N06D A Acetylcholinesterase inhibitors are recommended for use. In case of intolerance of these drugs or in the treatment of severe forms of AD, it is recommended to use drug from group N06DX-Other drugs for use in case of dementia, namely N06DX01 Memantine. In addition, the national Clinical Protocol also recommends N06BX06 Cerebrolysin and N06DX02 Ginkgo biloba drugs for the elimination of patients’ cognitive disorders [24]. Considering the socio-economic and medical-pharmaceutical importance of the issue of effective treatment of patients with dementia in AD, we further

analyzed the data of the National List of main medicines, the State Register of main medicines and the State Formulary of main medicines of the latest edition. The results of the analysis are presented in Table 4.

Table 3  
Analysis of the pharmaceutical component of documents, international recommendations, clinical protocols, and guidelines regulating the organization of pathogenetic therapy for patients with AD dementia in different countries of the world.

Country or association of countries (Authority or organization that developed the relevant document. Name of the document)			
N06DA02 Donepezil	N06DA03 Rivastigmine	N06DA04 Galanthamine	N06DX01 Memantine
Countries of the Americas continent (APA. Treating Alzheimer's Disease and Other Dementias, A Quick Reference Guide)			
+	+	+	+
EU countries (EFNS)			
+	+	+	+
Australia. Clinical practice guidelines and principles of care for people with dementia			
+	+	+	+
Great Britain. NICE			
+	+	+	+
Japan (CBS)			
+	+	+	+
USA (FDA)			
+	+	+	+
Finland (Duodecim)			
+	+	+	+
Germany. The Association of the Scientific Medical Societies in Germany			
+	+	+	+
India. Indian Psychiatric Society Clinical Practice Guidelines			
+	+	+	+
Kazakhstan. Ministry of Health. "Clinical protocol for the diagnosis and treatment of dementia in Alzheimer's disease"			
+	* *	-	+

Note: +\* - present in list; -\*\*\*\*\* - absent in list

Table 4  
Results of the study of the pharmaceutical component of the Clinical Protocol, the National List of main medicines, the State Register of main medicines and the State Formulary of Ukraine (14th edition)

The source of the researched information			
N06DA02 Donepezil	N06DA03 Rivastigmine	N06DA04 Galanthamine	N06DX01 Memantine
National list of main medicines			
-*	-	-	-
The State Register of medicines			
+	+	+	+
The State Formulary of Ukraine of medicines			
+	-	+	+
Clinical protocol			
+	+	+	+

Thus, the absence of drugs N06DA02 Donepezil, N06DA03 Rivastigmine, N06DA04 Galanthamine and

N06DX01 Memantine in the National List of main medicines, which is known to have a priority in the organization of affordable and effective pharmaceutical care for the sick population, draws attention. As of January 2022, all four names of drugs recommended by relevant international organizations in the pathogenetic treatment of patients with AD dementia are registered in Ukraine. Analyzing the data of the State Formulary of Medicines of the 14th edition proved that only N06DA03 Rivastigmine was absent from the group of drugs recommended for use under the "Neurology" section. Thus, it could be stated that in Ukraine there is a problem with regulatory and legal regulation of circulation, first of all, the consumption of drugs that are recommended by relevant international documents and organizations in the pathogenetic treatment of dementia in AD.

The next stage of our research was a clinical and economic analysis of the frequency of prescriptions and consumption of drugs N06DA Inhibitors of acetylcholinesterase and N06DX-Other medicines for use in case of dementia. It was established that 2,487 drug prescriptions (100.0 %) were administered to patients with AD dementia during their stay in specialized nursing homes, of which 9.41 % (234 prescriptions) were for the drugs presented above. On average, such patients were treated for 43.8 bed days. Table 5 shows the results of the structural analysis of prescription frequencies, as well as the consumption indicator by drugs from groups N06DA Acetylcholinesterase inhibitors and N06DX-Other medicines for use in dementia. The disproportionate nature of prescriptions for various drugs in accordance with the international non-proprietary names (INN) of drugs draws attention. Thus, the number of prescriptions for drugs from groups N06DA Acetylcholinesterase inhibitors and N06DX-Other drugs for use in dementia ranged from 3 (N06D A05 Ipidacrine and N06D X02 Ginkgo leaves) to 188 (N06D X01 Memantine). In addition, the group of drugs N06DX01 Memantine had the largest number of trade names of drugs that were prescribed to patients. Thus, the highest  $K_i$  values were characteristic of N06DX01 Memantine ( $K_i=0.80$ ). N06DA03 Rivastigmine drugs ( $K_i=0.15$ ) were presented in the second position with a significant margin, and N06DA02-Donepezil in the third place ( $K_i=0.03$ ). Analysing the frequency analysis data, it should be noted that doctors prescribed N06DA05 Ipidacrine drugs, which were not included in international recommendations, clinical protocols, or guidelines for the treatment of dementia in AD. At the same time, it should be noted that N06DA05 Ipidacrine preparations are included in the State Formulary of Medicines, which has a recommendatory nature regarding use in the medical process. Thus, in the "Neurology" section, it is indicated that N06DA05 Ipidacrine drugs are recommended for use in the treatment of mono- and polyneuropathies, polyradiculopathy, neuropathy, neuritis, polyneuritis, myasthenia and myasthenic syndrome of various etiologies, bulbar palsies and paresis, as well as in the recovery period of organic lesions of the central of the nervous system, which are accompanied by movement disorders [26].

548,714.5 UAH (19,072.45 USD) was spent on the pharmaceutical support of patients with AD dementia during the entire period of their treatment, which was 2,743.57 UAH or 95.36 USD per patient. At the same time, the specific weight (%) of consumption of drugs from groups N06DA Inhibitors of acetylcholinesterase and N06DX-Other medicines for use in case of dementia was 16.82 % (Fig. 1).

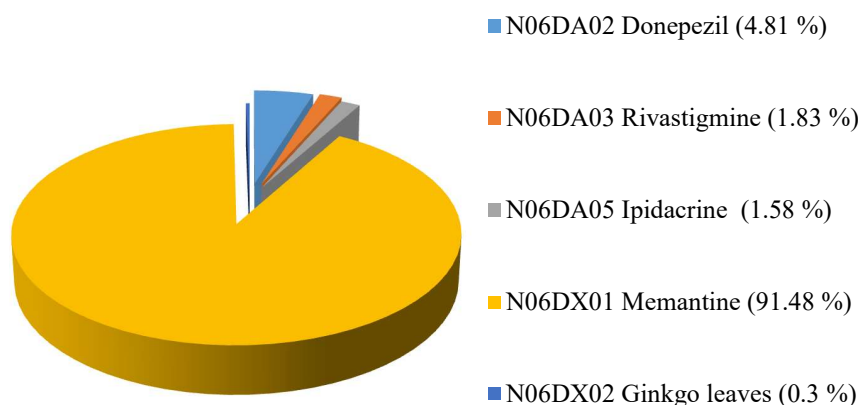


Fig. 1. Analysis of the structure of consumption of drugs from groups N06DA Inhibitors of acetylcholinesterase and N06DX-Other medicines for use by patients with dementia in AD

Table 5

The results of a structural analysis of the frequency of prescriptions and consumption of drugs from the N06D group – Medicines for use in dementia by patients with dementia in AD

Medicine code by ATC, INN and trade name	Prescription frequency/ $K_p$	The cost of drug consumption	
		The national currency (UAH)	USD
N06DA Acetylcholinesterase inhibitors			
N06D A02 Donepezil: <i>Alzepil</i> tab., coated with a film. 5 mg, No. 14	6/0.03	4,447.92	154.60
N06D A03 Rivastigmine 3 mg No. 30	28/0.12	1,433.76	49.84
N06D A03 Rivastigmine 1.5 mg No. 30	6/0.03	260.26	9.05
N06D A05 Ipidacrine <i>Paraphexine</i> 1.5 % 5.0 i/m No. 10	3/0.02	1,468.78	51.05
Total	43/0.2	7,610.72	264.54
N06D X Other medicines for use in case of dementia			
N06D X01 Memantine 10 mg No. 30	3/0.02	479.71	16.67
N06D X01 Memantine: <i>Membral</i> 10 mg No. 30	25/0.11	1,057.32	36.75
<i>Abixa</i> tab., coated with a film. 10 mg No. 28	34/0.15	62,194.44	2,161.78
<i>Memma</i> 10 mg No. 30	15/0.06	4,695.30	163.20
<i>Мемокс</i> tab., 10 mg, No. 30	108/0.46	14,267.59	495.92
<i>Mema</i> tab., coated with a film. 10 mg, No. 30	3/0.02	1,725.84	59.99
N06D X02 Ginkgo leaves <i>Bilobil-intense</i> 120 mg capsules No. 60	3/0.02	279.62	9.72
Total	191/0.84	84,699.82	2,944.03
In sum	234/1.04	92,310.54	3,208.57

As we could see from the data in Fig. 1, the specific weight (%) of consumption of LP from the group N06DA Acetylcholinesterase inhibitors was equal to the value of 8.22 % (7610.72 UAH or 264.53 USD). The rest (91.48 %) belonged to drugs from group N06DX-Other medicines for use in case of dementia. The undisputed leader, both in

terms of frequency of prescriptions and consumption, was N06DX01 Memantine (84,420.20 UAH or 2,934.31 USD). Thus, it could be stated that, on average, one patient with dementia with AD had 0.94 prescriptions of N06 X01 Memantine, in the average amount of 422.20 UAH or 14.67 USD. N06DA02 Donepezil drugs (4447.92 UAH) were presented in the second position in terms of consumption amount, and N06DA03 Rivastigmine drugs (1694.02 UAH) were presented in the third place. The fact that N06DA04 Galanthamine drugs, which are presented in the domestic Clinical Protocol in the case of pathogenetic treatment of mild and moderate forms of AD, as well as recommended by relevant international protocols and guidelines in different countries of the world, were not included in the prescriptions is noteworthy.

### 5. Discussion of research results

Systematizing the results of the conducted research, it is possible to assert the following. The pharmaceutical component of the domestic Clinical puncture for pathogenetic treatment of patients with dementia in AD contains all four names of drugs recommended by relevant international documents, protocols, and guidelines, except for A04 Galanthamine drugs. In turn, N06DA02 Donepezil, N06DA03 Rivastigmine, N06DA04 Galanthamine and N06DX01 Memantine were not included in the National List of main medicines, which regulates the circulation of drugs in the country. Considering the significant dominance of the group of dementia patients with AD from socially disadvantaged segments of the population, as well as the global trends towards an increase in the number of such patients [9, 28] and a gradual decrease in the age at which the first signs of cognitive impairment occur, the issue of financial support for such patients is of great importance for formation of the humanistic profile of modern psychoneurology. The question of significant dominance in the structure of prescriptions, as well as the consumption of N06DX01 Memantine drugs, remains open. In accordance with the data of the domestic Clinical Protocol and special literature, N06DX01 Memantine drugs are recommended for use in patients with dementia in case of intolerance to N06DA Acetylcholinesterase inhibitors and severe forms of AD. Thus, the specific weight (%) of prescriptions for these drugs (80.34 % of prescriptions for drugs used in

the pathogenetic treatment of patients) and in consumption (91.48 %) makes it possible to assert that such patients were admitted to specialized health care facilities in extremely difficult, and even in a run-down condition. That is, considering the significant resource burden associated with pharmacotherapy of cognitive functions in these patients in the late stages of AD, the issue of timely detection of early symptoms and preventive treatment is important. As part of the expansion of the range of services that can be provided to chronic patients in pharmacies, the issue of active involvement of pharmaceutical workers in the pharmacotherapeutic support of such patients is becoming more and more relevant every year. This will make it possible to significantly reduce the financial burden on specialized healthcare facilities and, at the same time, will allow more active development of socially oriented forms of pharmacy customer service.

The presence of drugs from the N06D A05 Ipida-crine group in the prescriptions should also be attributed to the peculiarities in the formation of the pharmaceutical component of the treatment process for patients with dementia with AD, which we have established. These drugs were not included in both domestic and international clinical protocols and guidelines for the treatment of cognitive impairment in patients with dementia that develops because of AD. On the contrary, N06DA04 Galanthamine drugs, which are recommended by domestic and international clinical protocols and guidelines for the treatment of mild and moderate forms of AD, were absent in the prescriptions.

**Study limitations.** The main limitations in conducting our research include those caused by the order of formation of the information and statistical base at the result-applied stage of the analysis. First, it is a selection of countries for which the analysis of relevant documents was carried out, which regulate the issue of the organization of medical and pharmaceutical support for patients with dementia in AD. Secondly, the selection of data on medicinal purposes of drugs, as well as the subsequent calculation of their consumption, was carried out according to a limited number of specialized health care facilities. Therefore, to form final conclusions regarding the assessment of the state of pharmaceutical support for patients with dementia with AD on a nationwide scale, further research in the specified direction is required. Moreover, at present, in addition to the Clinical Protocols, which are approved by the relevant order of the Ministry of Health of Ukraine for various health-related diseases, doctors could also use local drug formularies. In addition, drug consumption indicators could also be adjusted in accordance with the regional characteristics of the development of the corresponding segment of the pharmaceutical market.

**Prospects for further research.** All the above makes it possible to assert that the issue of rational use of limited health care resources, which are directed to the pharmaceutical provision of such socially significant and at the same time costly groups of chronic patients, requires further analysis based on a wide range of research. First, in the light of the health care financing reforms implemented from January 2022, many questions arise regarding the resource provision of psychoneurological patients. Cur-

rently the domestic health care is not able to fully finance the life-long treatment of patients with AD dementia, especially in inpatient settings. Therefore, we consider the development of directions for the organization of effective cooperation between doctors, pharmacists, and social workers in the way of early detection of cognitive disorders, social support of such patients and their pathogenetic and symptomatic treatment to be one of the promising directions of our further research. Unfortunately, as the analysis of domestic literary sources showed, there are no works by scientists in the last 5 years, which would analyze data on prescriptions and consumption of drugs by dementia patients with AD in Ukraine. Therefore, research in this direction has a certain perspective. In addition, it should be noted that the stigmatization of these patients in Ukrainian society also requires appropriate research in the social and legal space.

## 6. Conclusions

The need to provide affordable and effective medical care for patients with dementia in AD against the background of the incurable nature of the development of this pathology creates objective conditions for the development of directions for the rational use of resources directed by the state for the implementation of humanistic principles of the development of society. In Ukraine, the mentioned principles are declared in many legislative and regulatory acts, but the issue of their effective implementation is impossible without considering the relevant international experience [6, 29]. The introduction of socially oriented models of care for psychoneurological patients in Ukraine cannot be considered without an analysis of those requirements presented in relevant international documents and clinical guidelines. In general, it should be noted that the state of pharmaceutical support for dementia patients with AD in Ukraine corresponds to the indicated international recommendations. At the same time, the issue of resource provision of pharmaceutical support for these patients remains unsolved. This problem should be considered at all levels of the organization of the treatment process.

## Conflict of interests

The authors declare that they have no conflict of interest in relation to this research, whether financial, personal, authorship or otherwise, that could affect the research and its results presented in this paper.

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