

CODEINES MEDICINE: ABC/VED ANALYSIS, EFFECTIVENESS AND RATIONALITY OF APPLICATION

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Introduction

Pharmacoeconomics, as a scientific discipline, is a key component of the modern health care system. It allows to evaluate the effectiveness and rationality of the use of medicines from the point of view of economic benefit, accessibility for patients. One of the most important methodologies used in pharmacoeconomic to optimize administration, prescribing, and procurement is ABC and VED analysis. These methods are aimed at classifying medicines by importance and cost, which helps to efficiently allocate resources and reduce costs, while maintaining the quality of medical and pharmaceutical care [1-5].

Today, codeine is part of many combined medicines used in the pharmacotherapy of health disorders according to the International classification of diseases of the 11th revision (ICD-11). It is important to provide timely medical and pharmaceutical assistance to patients with respiratory, pain syndromes, and diseases of the respiratory organs. Particular attention is paid to victims of injuries, traffic accidents, participation in hostilities, thoracic injuries [6-8].

However, the use of codeine medicine comes with a number of problems, including the risk of addiction and side effects. This presents the health care system with the task of finding a balance between the effectiveness of these drugs and the risks associated with their use [9, 10].

The pharmacoeconomic analysis of ABC/VED for codeines medicine becomes an important tool for making decisions about the expediency of their appointment and use in clinical practice. ABC analysis involves the classification of medicines according to their contribution to the total cost of treatment: category A includes the most expensive medicines, category B – medicines of average cost, and category C – the least expensive. This analysis makes it possible to determine which of the codeine medicines consume the most resources and require special attention from medical institutions [11].

In turn, the VED analysis classifies medicines according to their clinical significance: category V (vital) includes vitally necessary medicines, category E (essential) – important but not critical, and category D (desirable) – desirable but less significant from a clinical point of view. This allows medical institutions to optimize the use of medicines, focusing resources on the most important of them, including those that are vital.

The combined approach of ABC/VED makes it possible to build an effective management strategy of codeines medicine, taking into account both economic and clinical aspects. This article will consider the application of ABC/VED analysis to codeines medicine used in the health care system, in order to determine ways to increase the efficiency of their use and optimize treatment costs.

The importance of research for the health care system

The results of the pharmacoeconomic ABC/VED analysis of codeines medicine are important for optimizing the use of resources in the health care system. First, such an analysis will allow identifying the most expensive medicines and developing strategies for their effective use, which will help reduce costs. Second, it will provide medical institutions with the tools to make informed decisions about the purchase and prescription of medicines, taking into account their clinical significance.

In particular, optimizing the use of codeine-containing medicines is critically important for reducing the risk of addiction among patients, which is one of the main problems in modern medicine.

Relevance of the research

The increase in the number of diseases accompanied by pain syndromes and requiring analgesia has led to an increased demand for opioid medicines, to which codeine belongs. It is often prescribed for the relief of moderate and mild pain, for the pharmacotherapy of cold, cough, and respiratory symptoms. Codeines medicine is used both as monotherapy and in combination with other medicines, which increases their clinical significance [9, 10].

However, the use of codeine comes with certain risks. First, there is the possibility of addiction, which is a significant problem with long-term use. Second, codeine can cause a number of side effects, such as drowsiness, dizziness, decreased respiratory activity, which also limits its use, especially in vulnerable groups of patients, such as children and the elderly. In this regard, the pharmacoeconomic analysis of such medicines becomes an important step on the way to their rational use.

In view of this, it is urgent to carry out a comprehensive ABC/VED analysis of codeines medicine in order to determine their clinical significance and economic feasibility. Such a study will ensure the effective and safe use of these medicines in medical practice, and will also contribute to reducing the financial pressure on the health care system.

The purpose and objectives of the research

The purpose of this study is to conduct a pharmacoeconomic analysis of codeines medicine using ABC and VED methods. The main tasks of the research are:

1. Assessment of the economic value of codeines medicine and their contribution to the total costs of medicines in medical institutions.
2. Classification of codeines medicine according to their clinical significance and determination of vital, important and desirable medicines.

3. Development of recommendations for the rationalization of the use of codeine medicine in medical practice.
4. Analysis of the risks associated with the use of codeine, considering the possibility of developing addiction and side effects.

ABC/VED analysis methodology

ABC/VED analysis is one of the key methods of pharmacoeconomic evaluation, which allows to classify medicines depending on their cost and significance for patients. ABC analysis is based on the Pareto principle, according to which approximately 20% of medicines are responsible for 80% of costs in a medical facility. This makes it possible to highlight the most expensive medicines and focus on their effective use [5, 11].

On the other hand, VED-analysis allows to classify medicines according to their clinical importance. Medicines of category V are vitally necessary; they must be available in medical facilities at all times. Medicines of category E are of great clinical importance, but their absence in the short term will not lead to critical consequences for patients. Medicines of category D, in

turn, are preferred, but their use may be limited or replaced by other means.

The combination of ABC and VED analysis makes it possible to obtain a comprehensive picture that reflects not only the economic aspects, but also the clinical significance of medicines. This allows you to make informed decisions about procurement, use and optimization of resources in medical institutions.

Results and discussion

As part of the pharmacoeconomic analysis of codeines medicine, an assessment of their value and specific weight in the overall cost structure was performed. Table 1 below contains a list of codeines medicine available on the market, with information on their release form, price per dose unit and specific weight as a percentage of the total cost of such medicines. This analysis allows you to determine the most expensive positions and compare their economic significance, which is the basis for making decisions about the rational use of these medicines.

Table 1. ABC/VED analysis of codeines medicine by release form, price and specific gravity

No.	Name of medicine	Release form	Price of unit dose (UAH)	Specific gravity (%)
1.	Pentalgin-Zdorovya	pills	2,25	0,56
2.	Pentased	pills	3,01	0,75
3.	Pentalgin IC	pills	3,44	0,86
4.	Pyatirchatka IC	pills	4,26	1,07
5.	Kodeterp	pills	4,78	1,20
6.	Kodeterp H	pills	4,80	1,20
7.	Solpalgin	capsules	4,87	1,22
8.	Paracod IC	pills	6,22	1,56
9.	Bifok IC	pills	6,70	1,68
10.	Codepsin	pills	7,00	1,75
11.	Pentalgin FS extra capsules	capsules	7,00	1,75
12.	Solpadein	pills	7,70	1,93
13.	Solpadein	effervescent tablets	7,75	1,94
14.	Pentalgin-FS	pills	7,95	1,99
15.	Kodterpin IC	pills	8,70	2,18
16.	Codeine phosphate	pills	9,00	2,25
17.	Caffein	pills	9,99	2,50
18.	Kofex	syrup	14,58	3,65
19.	Codefemol H	syrup	15,00	3,76
20.	Codesan IC	pills	19,67	4,93
21.	Omnopon-ZN	solution for injection	100,0	25,05
22.	Omnopon Neo	solution for injections	144,6	36,22
			399,27	100,00

Table 1 contains information on 22 codeines medicine available in different forms (tablets, capsules, syrups and solutions for injection), their cost per unit dose (from 2.25 to 144.6 UAH) and specific gravity in percentage. The most expensive solutions for injections are "Omnopon-ZN" and "Omnopon Neo", which make up the largest share of total costs – 25.05% and 36.22%, respectively. Other medicines, in particular tablets and capsules, have a lower cost and, accordingly, a lower specific gravity, ranging from 0.56% to 4.93%. The total

cost of all medicines in Table 1 is 399.27 UAH, with cost allocation across all medicines.

ABC analysis is one of the key methods of pharmacoeconomic evaluation, which is used to determine the economic significance of various medicines within the limits of the total costs of medicines. In the context of codeines medicine, this method allows you to determine which of them are the most expensive and which take the largest share in the total costs, as well as to identify

medicines that require special attention when planning purchases and optimizing costs.

Table 2 presents the results of the ABC analysis of codeines medicine, classifying medicines into three categories: A, B and C. Medicines of category A are the most expensive and form the main share of total costs (more than 80%). Category B includes medicines of average cost, occupying approximately 15% of costs. Medicines of category C are the least expensive, but no less important for the overall treatment process, with a share of about 4%.

Prices as of June 2024 were taken from the medicines catalog posted on the website of Pharmacy 911. This catalog presents a wide range of medicines of different spectrum of action, which allows you to get up-to-date information on the cost of both prescription and over-the-counter medicines. Such information is useful for analyzing the market of pharmaceutical medicines and evaluating the price policy in pharmacies of Ukraine at the current moment [12].

Table 2. ABC analysis of codeines medicine

No.	Trade name	Price of unit dose (UAH)	Specific gravity (%)	ABC category
1.	Kodterpin IC	8,70	2,18	A
2.	Codeine phosphate	9,00	2,25	A
3.	Caffein	9,99	2,50	A
4.	Kofex	14,58	3,65	A
5.	Codefemol H	15,00	3,76	A
6.	Codesan IC	19,67	4,93	A
7.	Omnopon-ZN	100,0	25,05	A
8.	Omnopon Neo	144,6	36,22	A
	Together by category A	321,54	80,53	
9.	Kodeterp H	4,80	1,20	B
10.	Solpalgin	4,87	1,22	B
11.	Paracod IC	6,22	1,56	B
12.	Bifok IC	6,70	1,68	B
13.	Codepsin	7,00	1,75	B
14.	Pentalgin FS extra capsules	7,00	1,75	B
15.	Solpadein	7,70	1,93	B
16.	Solpadein	7,75	1,94	B
17.	Pentalgin-FS	7,95	1,99	B
	Together by category B	59,99	15,02	
	Together by AB categories:	381,53	95,56	
18.	Pentalgin-Zdorovya	2,25	0,56	C
19.	Pentased	3,01	0,75	C
20.	Pentalgin IC	3,44	0,86	C
21.	Pyatirchatka IC	4,26	1,07	C
22.	Kodeterp	4,78	1,20	C
	Together by category C:	17,74	4,44	
	Together by ABC categories:	399,27	100,00	

As the results of ABC analysis showed, category A included medicines, the use of which was equal to 80.53% of the total rate of use; to category B – 15.02%, and to category C – 4.44%.

Category A includes 8 codeines medicine (Kodterpin IC, Codeine phosphate, Caffein, Cofex, Codephemol N, Codesan IC, Omnopon-ZN, Omnopon Neo), the cost of one unit. doses of which is 321.54 UAH, which is 80.53% of the total cost.

Category B included 9 codeines medicine (Kodeterp N, Solpalging, Paracod IC, Bifok IC, Codepsin, Pentalgin FS extra capsules, Solpadein, Solpadein, Pentalgin-FS) total cost per unit. the dose of which is 59.99 UAH (15.02%), and for category C – 5 medicines (Rentalgin-health, Pentased, Pentalgin IC, Pyatirchatka IC,

Kodeterp) with a cost of 17.74 UAH per unit. dose (4.44%).

In order to evaluate the effectiveness of the use of codeine medicine, a VED analysis was performed. When conducting this analysis, the following approach was used: distribution of medicines into categories V – "vital" (vital); E – "Essential" (necessary) and D – "Desirable" (secondary, unimportant).

This analysis was carried out using 2 current legal documents, namely:

- resolution of the Cabinet of Ministers of Ukraine dated March 25, 2009 No. 333 "Some Issues of State Regulation of Prices for Medicinal Products and Medical Products" (hereinafter – Resolution);
- order of the Ministry of Health of Ukraine dated March 12, 2024 No. 418 "On approval of the sixteenth edition of

the State Formulary of Medicinal Products and ensuring its availability" (hereinafter – the State Formulary) [13-16].

It should be noted that a formal approach was used for VED analysis.

So, if there are 2 of the listed documents in the lists, medicines belonged to category V; in the lists of the

resolution or the State formulary - to category E, and the absence of medicines in all regulatory and legal documents - to category D.

Table 3. VED analysis

No.	Trade name	VED category
1.	Codeine phosphate	E
2.	Omnopon-ZN	E
3.	Pentalgin FS extra capsules	E
4.	Pentalgin-FS	E
5.	Pentalgin IC	E
6.	Pyatirchatka IC	E
7.	Kodterpin IC	D
8.	Caffein	D
9.	Kofex	D
10.	Codefemol H	D
11.	Codesan IC	D
12.	Omnopon Neo	D
13.	Kodeterp H	D
14.	Solpalgin	D
15.	Paracod IC	D
16.	Bifok IC	D
17.	Codepsin	D
18.	Solpadein	D
19.	Solpadein	D
20.	Pentalgin-Zdorovya	D
21.	Pentased	D
22.	Kodeterp	D

According to the results of the VED analysis, it was established that some medicines belong to category E. This includes Codeine phosphate, Omnopon-ZN, Pentalgin FS extra capsules, Pentalgin-FS, Pentalgin IC and Pyatirchatka IC.

On the other hand, category D included several other medicines, including Kodterpin IC, Caffeine, Kofex, Codefemol H, Codesan IC, Omnopon Neo, Kodeterp H, Solpalgin, Paracod IC, Bifok IC, Codepsin, Solpadein, Solpadein, Pentalgin-Zdorovya, Pentased and Kodeterp.

Regarding category V, none of the medicines are included in this category according to the results of the analysis. Below, Fig. 1 shows the distribution of medicines by VED categories - analysis.

As a result of the ABC analysis and VED analysis, it was of interest to conduct a combined ABC/VED analysis, the data of which are shown in Table 4.

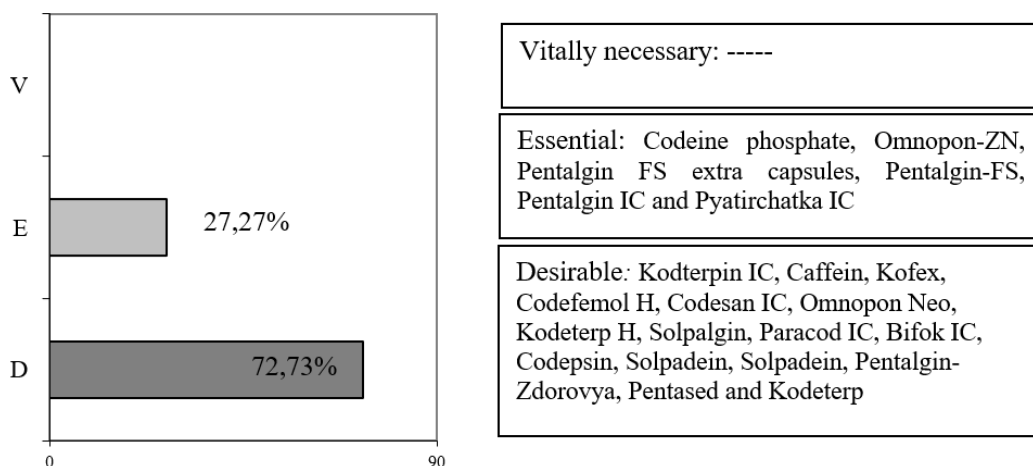


Fig. 1. Distribution of studied codeines medicine by categories of VED-analysis.

Table 4. Results of the combined ABC/VED-analysis of the investigated medicines

Categories	Number	V		Number	E		Number	D	
		Appointment			Appointment			Appointment	
		UAH	%		UAH	%		UAH	%
A	-	-	-	2	109,0	27,30	6	212,54	53,23
B	-	-	-	2	14,95	3,74	7	45,04	11,28
C	-	-	-	2	7,7	1,93	3	10,04	2,51
Together:	-	-	-	6	131,65	32,97	16	267,62	67,02

The conducted studies show that there were no costs for medicines under category V, and 131.65 UAH under category E. and D – the most expenditure of 267.62 UAH.

The share of expenses that fell on medicines by categories: A/V – 0%, by A/E – 27.30% and A/D – 53.23% is the largest indicator of the overall indicator of prescribing codeines medicine. By category B/V – 0%; by category B/E – 3.74% and B/D – 11.28%. Category C medicines had corresponding indicators: C/V – 0%, C/E – 1.93%; S/D – 2.51%.

Conclusion

The results of the ABC analysis of codeine medicines showed that the largest share of costs (80.53%) falls on medicines of category A, which includes 8 codeine medicines, such as Omnopon-ZN and Omnopon Neo, which are the most expensive. Category B medicines account for 15.02% of total costs, while Category C covers only 4.44%. This suggests that the main costs are concentrated on a small number of medicines, which may be important in making decisions about the rationalization of purchases and the use of medicines with codeine.

The results of the VED analysis showed that none of the codeine medicines belongs to the "vital" (V) category, which emphasizes the absence of these medicines from the lists of critical means. At the same time, some medicines were assigned to the "essential" category (E), in particular Codeine phosphate and Pentalgin-FS, which accounted for 27.30% of expenses in category A. Medicines that fell into the "secondary" category (D) accounted for the largest share of expenses – 53.23% in category A and 11.28% in category B.

The general distribution of costs indicates that the main costs are concentrated on medicines, which are not vitally necessary, but have a high specific weight in the total costs. This indicates the need to review the policy on the use of such codeine medicines and search for opportunities to optimize costs.

Conflict of interest. The authors confirm that they are the authors of this work and have approved it for publication. The authors also certify that the obtained data and research were conducted in compliance with the requirements of moral and ethical principles based on medical and pharmaceutical law, and in the absence of any commercial or financial relationships that could be interpreted as a conflict or potential conflict of interest.

Codeines Medicine: ABC/VED Analysis, Effectiveness and Rationality of Application

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Introduction. Pharmacoeconomic analysis is an important tool for evaluating the rational use of medicines, especially in conditions of limited funding. Codeine medicines are used to treat pain and cough, but their cost and share of total medicines costs can vary widely. The use of ABC and VED analyzes helps to estimate the costs and clinical importance of medicines, which allows to optimize the processes of their purchase and use. The aim. The purpose of this study was to conduct a pharmacoeconomic analysis of ABC/VED of medicines with codeine to assess their effectiveness and rationality of use. **Materials and methods.** The study was conducted using ABC analysis methods to determine the cost of medicines and their specific weight in total costs. To assess the clinical importance of medicines, VED analysis was used, which divided medicines into the categories of vital, necessary and secondary. **Results.** According to the results of the ABC analysis, the 8 most expensive medicines, which make up 80.53% of the total costs, are included in category A. Medicines of category B accounted for 15.02% of costs, and category C – 4.44%. The VED analysis showed that no medicines fall into the essential (V) category, and the majority of medicines fall into the essential (E) and secondary (D) categories, with the largest share of spending on category D medicines. **Conclusions.** The conducted pharmacoeconomic analysis revealed that the main costs fall on medicines that are not vitally necessary, but have a high specific weight in the total costs. The results of the study allow us to draw a conclusion about the need to optimize the use of codeine-containing medicines to reduce the financial burden on the health care system.

Keywords: pharmacoeconomic analysis, ABC analysis, VED analysis, medicines with codeine, costs, rationality of use, optimization.

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