

Evaluation of consumption in defined daily doses of drugs used in hospitals

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Abstract

Background: Irrational use of medicines that is wasteful and harmful presents an extremely serious global problem. In developing and transitional countries, in primary care less than 40% of patients in the public sector and 30% of patients in the private sector are treated in accordance with standard treatment guidelines.

Material and methods: For this study we used data of 2009-2013 period, in the Emergency Medicine Institute, which show the dynamics of consumption of medicinal remedies from pharmaco-therapeutic group A – Alimentary tract and metabolism.

Results: The annual consumption of drugs from group A – Alimentary tract and metabolism in the evaluated period varied in value indicators from 999 195 lei in 2009 to 1 042 562 lei in 2013 or by 4.4% and respectively in natural indicators from 123 479 grams in 2009 to 145 092 grams in 2013 or by 117.5%, in total units Defined Daily Doses (DDD)/1000 from 488 in 2009 to 1128 units in 2013 or by 212% and the cost of one DDD/1000 from 5180.7 lei in 2009 to 5397.5 lei in 2013 or by 4.2%. The DDD of 24 medicinal remedies were determined in the Emergency Medicine Institute.

Conclusions: The obtained data reveals that from 3 basic characteristics of drug consumption, DDD is the most objective and can be considered as the cornerstone for making decisions on determining the needs and organization of rational use of medicines.

Key words: drug supplies, defined daily dose, rational drug use, hospitals.

Introduction

In developing and transitional countries, in primary care less than 40% of patients in the public sector and 30% in private sector are treated in accordance with standard treatment guidelines [1]. From 2911 scientific papers devoted to medicines published in China during the years 1990 – 2008, 14.5% were about evaluation of medicinal remedies from pharmaco-therapeutic group A – Alimentary tract and metabolism [2]. There are numerous sources of evaluation data of drugs consumed in hospitals especially of alimentary tract and metabolism group that present a particular permanent scientific and practical interest [3-13]. Nevertheless, in the Republic of Moldova the analysis in Defined Daily Doses (DDD) as an important indicator of optimal rational use of drug remedies generally, and alimentary tract and metabolism ones, in particular, is not studied enough and not highlighted by scientific research literature.

The National Scientific-Practical Centre of Emergency Medicine of the Republic of Moldova reorganized in 2014 in Emergency Medicine Institute (EMI), was founded in 1959. Clinical Services of EMI include: Orthopedic-Traumatology Clinic for 150 beds, Surgery Clinic for 140 beds, Neurosurgery Clinic for 80 beds, Neurology Clinic for 70 beds, Maxillo-Facial clinic for 30 beds, Urology Clinic for 40 beds, Gynecology Clinic for 30 beds, Microsurgery Clinic for 30 beds, Municipal Center with 8 seats hemodialysis and 9 beds, Clinical intensive care unit for 30 beds, in total the above services of the EMI include 600 beds, also include 5 emergency medical help substations and 4 out-patient departments of traumatology and orthopedics [14].

The primary aim of the study was to evaluate institutional representative data on alimentary tract and metabolism drugs utilization for five year (2009-2013) period, in accordance with World Health Organization (WHO) requirements, projected to determine the value of Defined Daily

Doses per 1000 Occupied-Bed Days (DDD/1000) [15]. To ensure fuller study it was necessary to determine the DDD of medical remedies for this group of drugs which have been used in EMI, but that are not published by WHO. Based on obtained data, it aimed to make conclusions on the use of alimentary tract and metabolism drugs in the medical institutions and to propose recommendations for ensuring their optimization.

Material and methods

For this study we used data of a five-year (2009-2013) period, in EMI, which show the dynamics of consumption of medicinal remedies from pharmaco-therapeutic group A – Alimentary tract and metabolism, classified as Anatomical Therapeutic Chemical (ATC), classification system of WHO indicating the nature and value. Statistical, analytical, mathematical, comparative, logical and descriptive methods of study were used.

Results and discussion

To determine DDD and compare the consumption of alimentary tract and metabolism drugs for the period of 2009-2013, the statistics data concerning the number of treated patients (patients with health insurance and other free treated by the state categories of citizens were involved), the number of bed/days and total annual quantities of medicines were used. In figure 1 is presented consumption of parenteral form of drugs from Alimentary tract and metabolism group in natural indexes “grams” in EMI for the evaluated period.

From figure 1 we find that the main volume of consumption of medicinal remedies of group A – Alimentary tract and metabolism as parenteral administration in natural indices is subgroup A12 Mineral supplements which increased the consumption volume gradually from 29 560 grams or 47% of all amount in 2009 to 42 495 grams or 63% of all amount

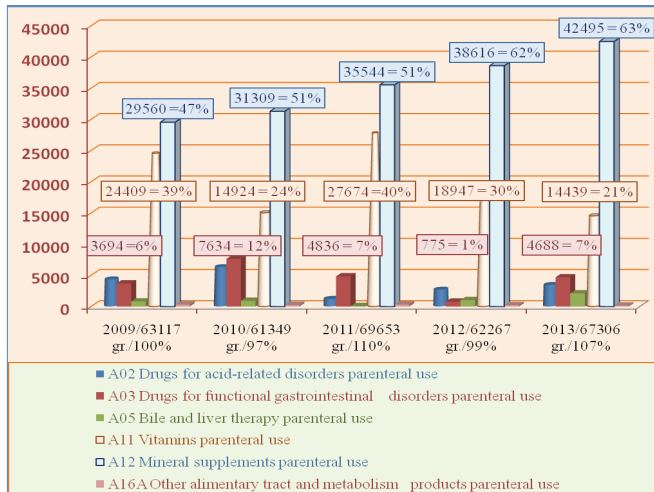


Fig. 1. Parenteral form consumption in natural indexes "grams" of drugs from Alimentary tract and metabolism group in Emergency Medicine Institute for the period from 2009 to 2013.

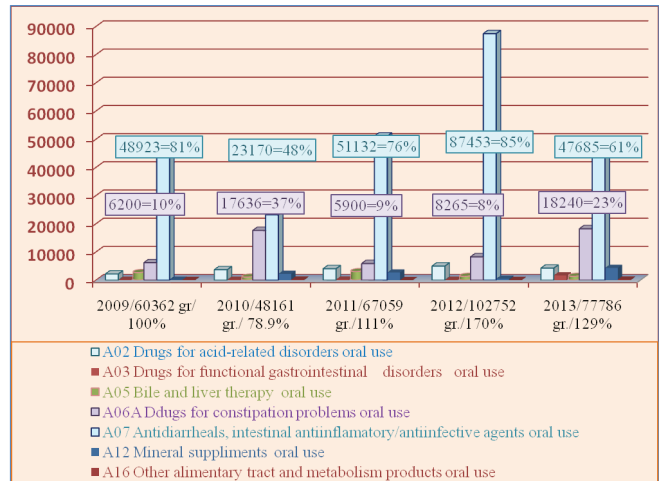


Fig. 2. Oral form consumption in natural indexes "grams" of drugs from Alimentary tract and metabolism group in Emergency Medicine Institute for the period of 2009 – 2013.

in 2013 consisting in a share of 43.8% during the evaluation period. The second subgroup in placement of consumption represents A11 "Vitamins", with a decrease from 24409 grams or 39% of all amounts in 2009, up to 14439 grams or 21% from amount in 2013 consisting in a share of 40.8% during the evaluation period. The rest of subgroups: A02 Drugs for acid-related disorders, A03 Drugs for functional gastrointestinal disorders, A05 Bile and liver therapy, A06 Drugs for constipation problems and A16 Other alimentary tract and metabolism products consumed apart less than 10%, together accounting 14% in 2009 and 16% in 2013.

The parenteral consumption form in value indices "Lei" of drugs Alimentary tract and metabolism in EMI for the period of 2009–2013 is presented in table 1.

The consumption in value indices (lei) for the parenteral use more than 10% per year is represented by four subgroups: A02 Drugs for acid-related disorders, A03 Drugs for functional gastrointestinal disorders, A11 Vitamins and A12 Mineral supplements and is 759 509 lei or 85.7% in 2009 and

856 449 lei or 96.9% in 2013. The rest of subgroups A05 Bile and liver therapy and A16 Other alimentary tract and metabolism products consumption in 2009 amounted to 127 034 lei or 14.3% in 2009 and 27 570 lei or 3.1% in 2013.

In the evaluated period a considerable increase was recorded for subgroups: A03 Drugs for acid-related disorders at 169 150 lei in 2009 to 223 484 lei in 2013 or by 32.2% and A12 Mineral supplements at 147 619 lei in 2009 to 254340 lei in 2013 or by 72.3 %.

The consumption of oral form of administration in natural indexes "grams" drugs of subgroups A Alimentary tract and metabolism in the period of 2009 – 2013 years is presented in figure 2.

From figure 2 it is clear that the main volume of consumption of medical remedies for enteral administration of Alimentary tract and metabolism group in natural indices is drugs of subgroup A07 Antidiarrheals, intestinal antiinflammatory/antiinfective agents, which minimal annual quota changed from 48% or 23 170 grams in 2010 to maximal 85%

Table 1

The parenteral consumption form in value indices "Lei" of drugs Alimentary tract and metabolism used in the period of 2009 –2013

Years	2009	2010	2011	2012	2013
Pharmacotherapeutic groups/value indexes	Lei	Lei	Lei	Lei	Lei
A02 Drugs for acid-related disorders	275306	346071	243018	359853	302621
A03 Drugs for functional gastrointestinal disorders	169150	172073	134006	75917	223484
A05 Bile and liver therapy	84256	89815	22226	8019	15610
A11 Vitamins	167434	75515	103520	84544	76004
A12 Mineral supplements	147619	157817	178154	237089	254340
A16A Other alimentary tract and metabolism products	42778	26420	29972	22189	11960
Total	886543	867711	710895	787610	884019
Percentage	100%	98,00%	80,00%	89,00%	100%

Table 2

The oral form consumption in value indices “Lei” of drugs from Alimentary tract and metabolism group for oral use in the period of 2009–2013

Years	2009	2010	2011	2012	2013
Pharmacotherapeutic groups/values indexes/percentage	Lei	Lei	Lei	Lei	Lei
A02 Drugs for acid-related disorders	9025	4820	54223	17789	87012
A03 Drugs for functional gastrointestinal disorders	12604	3667	10455	2925	3963
A05 Bile and liver therapy	3646	1685	5824	2754	5023
A06A Drugs for constipation problems	5523	14152	5798	6209	16378
A07 Antidiarrheals, intestinal antiinflammatory/antiinfective agents	80650	24735	61257	50839	39864
A12 Mineral suppliments	428	2339	3018	1906	3905
A16 Other alimentary tract and metabolism products	773	2582	889	1353	2399
Total	112649	53980	141464	83775	158544
Percentage	100%	48%	126%	74%	141%

or 87 453 grams in 2012. Despite considerable deviations in 2010 and 2012, the consumption of 48 923 grams in 2009 differs slightly from the consumption of 47 685 grams in 2013 that represents a small decrease of 2.5%.

The second subgroup was placed after consumption volume A06 with the minimal annual quota of 8% in 2012 to maximal of 37% in 2010, and with the highest consumption of 18 240 grams in 2013. The overall total consumption in the studied period for enteral form represents an increase from 60 362 grams in 2009 to 77 786 grams in 2013 or by 29%.

Consumption of drugs from subgroups A Alimentary tract and metabolism in oral form in value indices “Lei” for the period of 2009 – 2013 years is presented in table 2.

As shown in table 2, the consumption value for enteral administration form in the evaluated period, with representative annual rate of more than 10% is represented by two subgroups A02 Drugs for acid-related disorders (from 2011 to 2013) and A07 Antidiarrheals, intestinal antiinflammatory/antiinfective agents, which in 2009 amounted to 89 675 lei or 79.6%, and in 2013 constituted an amount of 126 876 lei or 80%. A considerable increase in consumption was for subgroup A02, from 9 025 lei in 2009 to 87 012 lei in 2013 or by 9.7 times. A considerable decrease in consumption was for subgroup A07 from 80 650 lei in 2009 to 39 864 lei in 2013 or by 2.02 times.

Total consumption in value indices “Lei” of drugs from subgroups A Alimentary tract and metabolism for parenteral and oral use in EMI in the period of 2009 – 2013 years is presented in figure 3.

The main assessed indices of volume were determined during the consumption of medicinal remedies of three subgroups A02 Drugs for acid-related disorders, A03 Drugs for functional gastrointestinal disorders and A12 Mineral supplements which showed a consumption respectively in 2009 of 284 331 lei (28.8%), 181 754 lei (17.2%), 148 047 lei (15%), the total 644 132 lei (64.47%) and in 2013 recorded 389 633

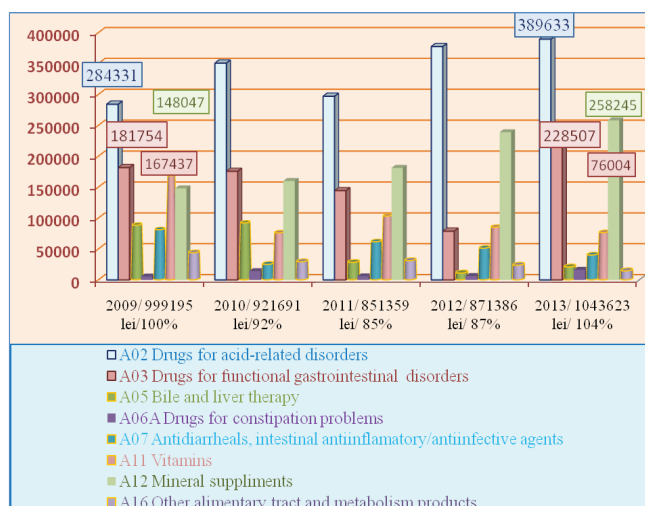


Fig. 3. Parenteral and oral consumption in value indices “Lei” of drugs from Alimentary tract and metabolism group in Emergency Medicine Institute in the period of 2009 – 2013.

lei (37.4%), 228 507 lei (21.9%), 258 245 lei (24.8%), with a total for the mentioned subgroups of 876 385 lei (84.0%).

Each of listed subgroups marked an increase of 37%, 25.8%, 74.5% respectively, or a total increase of 36.1%. A considerable decrease in consumption recorded subgroups A05 Bile and liver therapy, A11 Vitamins and A16 Other alimentary tract and metabolism products, which in 2009 had a total consumption of 298 824 lei or 29.9% for all amount, and in 2013 recorded respectively a total of 110 996 lei or 10.7% for all amount, or a total decrease for the mentioned subgroups of 62.8%. Nevertheless, total consumption of drugs from Alimentary tract and metabolism group during the evaluation period marked an increase of 104.4% in 2013 compared to 2009.

The parenteral and oral form consumption in natural indices “grams” of drugs from Alimentary tract and metabo-

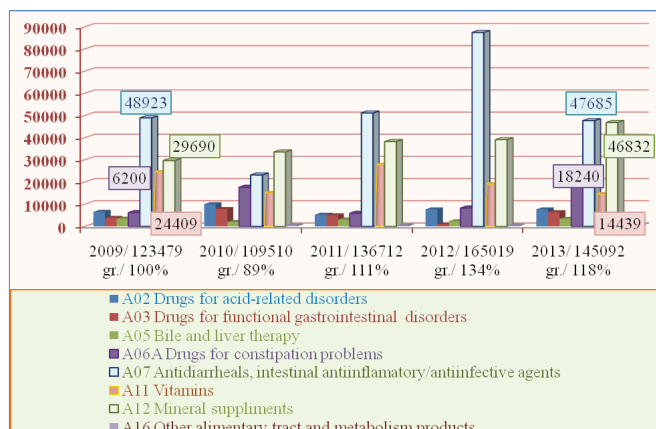


Fig. 4. Parenteral and oral form consumption in natural indices "grams" of drugs from Alimentary tract and metabolism group in Emergency Medicine Institute in the period of 2009 – 2013.

lism group in EMI in the period of 2009 – 2013 years is presented in figure 4.

As it could be seen from figure 4, a steady increase in

consumption for the period under review has been seen in subgroup A12 Mineral supplements from 29 690 grams to 46 832 grams or by 57.8%, and less stable for subgroup A03 Drugs for functional gastrointestinal disorders from 3 821 grams up to 6 389 grams or by 67.2% and A06 Drugs for constipation problems from 6 200 grams up to 18 240 grams or by 2.94 times. At the same time, a decrease in consumption during the mentioned period records subgroup A11 Vitamins, from 24 409 grams to 14 439 grams or by 41%. Total consumption of all subgroups in mentioned period has increased by 18%.

To assess the consumption of defined daily doses of drugs recommended by the WHO in case of absence of the drugs in the list of WHO was defined and used the notion of defined daily doses by the Emergency Medicine Institute (EMI) with the abbreviations DDDEMI. These doses were determined after the evaluation from 300 to 500 cases treated in different profile sections and different time periods. A list with nomenclature of drugs with DDD and DDDEMI used for the evaluation of medicines is presented in table 3.

Table 3

Defined Daily Doses determined in Emergency Medicine Institute

International names of drugs or their composition	Route	DDD (EMI)
A ALIMINARY TRACT AND METABOLISM		
A02A ANTACIDS		
Al. hydroxidum 218 mg + Mg hydroxidum 75 mg + Benzocainum 109 mg/5 ml	O	4824
Aluminii hydroxidum 218 mg + Magnesii hydroxidum 75 mg/5 ml	O	3516
Aluminii hydroxidum 3,5 g + Magnesii hydroxidum + 4 g/100 ml	O	4500
Aluminii hydroxidum 400 mg + Magnesii hydroxidum 400 mg	O	4800
Aluminii hydroxidum/Magnesii carbonas gel 450mg+Magnesii hydroxidum 300 mg	O	5250
Omeprazolom 20 mg + Clarithromycinum 250 mg + Tinidazolom 500 mg	O	1540
A03A DRUGS FOR FUNCTIONAL GASTROINTESTINAL DISORDERS		
Platyphyllini hydrotartras 0,2% 1 ml	P	6
A05B LIVER THERAPY, LIPOTROPICS		
Essential phaspholipids 50 mg, Pyridoxini hydrochloridum 0,5 mg, Cyanocobalaminum 2 mcg, Natrii D-pantothenas 0,3 mg, Nicotinamidum 5 mg, Vehiculum ad 1 ml.	P	750
Phospholipidum hipotalamus 300 mg	O	1800
Argininum 12,5 g + Sorbitolum 25 g	P	2500
Extractum chole 25mg+Extractum Cynarae scolimus 25mg+Curcumae longae pulvis+50 mg	O	3000
Kalii orotas 500 mg	O	1250
Silymarinum 35 mg	O	300
A06A DRUGS FOR CONSTIPATION		
Cassia acutifolia 70 mg	O	140
A07C ELECTROLYTES WITH CARBOHYDRATES		
Hidroreg 18.9g	O	18900
A11D VITAMIN B1, PLAIN AND IN COMBINATION WITH VITAMIN B6 AND B12		
Cyanocobalaminum 50 mg + Pyridoxinum 50 mg + Thiaminum 1 mg	P	101

A11J OTHER VITAMIN PRODUCTS, COMBINATIONS		
Cyanocobalaminum (B12) 0,5 mg, Nicotinamidum (PP) 20 mg, Cocarboxilaza (coenzim of vit. B ₁) 50 mg, Adenozintrifosfat disodic trihidrat (ATP) 10 mg	P	81
Magnesii lactas + Magnesii pidolas + Pyridoxinum	O	2850
A12B POTASSIUM		
Kalii chloridum 4% 10 ml	P	1600
Kalii aspartas + Magnesii aspartas 452 mg + 400 mg/10 ml	P	1704
Kalii aspartas + Magnesii aspartas 175 mg + 175 mg	O	1050
Kalii aspartas + Magnesii aspartas 158 mg + 140 mg	O	998
A16A OTHER ALIMENTARY TRACT AND METABOLISM PRODUCTS		
Ademetioninum 400 mg	P	600
Ademetioninum 400 mg	O	800

Note: O – oral, P – parenteral.

To determine the annual number of DDD in the period 2009–2013, the annual consumption in natural indices (grams), separate for each parenteral and enteral form was split to medicinal remedies DDD recommended by WHO, and respectively in their absence to the DDD (EMI) to obtain further amounts for each of the subgroups. The total of these data is shown in table 4.

The DDD consumption for some subgroups in some years varied considerably, but excluding the years when consumption is minimal and least compatible, annual average for A02 Drugs for acid-related disorders is 35423, A03 Drugs for functional gastrointestinal disorders is 64297, A05 Bile and liver therapy is 2483, A06 Drugs for constipation

Table 4

Parenteral and oral form consumption in DDD, of subgroups Alimentary tract and metabolism drugs in Emergency Medicine Institute in the period of 2009–2013

Administered forms	Measure unit	A02	A03	A05	A07	A11	A12	A16
2009								
Parenteral (WHO)	DDD	19947	49477		219	2083	317	60
Parenteral (EMI)	DDD	0	6650		115	110	331	
Oral (WHO)	DDD	7921	2339	600	334			1170
Oral (EMI)	DDD	444	0	57			230	
Total		28312	58466	657		2193	878	1230
2010								
Parenteral (WHO)	DDD	23009	76147	0	0	82769	242	831
Parenteral (EMI)	DDD	0	9143	1160	0	425	18535	
Oral (WHO)	DDD	13275	1337	0	3289			
Oral (EMI)	DDD	395	0	542			4684	
Total	DDD	36679	86627	1702	3289	83614	23461	831
2011								
Parenteral (WHO)	DDD	9630	55623			7241	377	1434
Parenteral (EMI)	DDD	0	10380			12	20346	7
Oral (WHO)	DDD	24806	1387	17	29134			
Oral (EMI)	DDD	704	0	2720	29		5657	120
Total	DDD	35140	67390	2737	29163	7415	26380	1561
2012								
Parenteral (WHO)	DDD	11514	46761	0		7241	20486	236
Parenteral (EMI)	DDD	0	9627	180		12	129	13
Oral (WHO)	DDD	22898	1397	0	2918			
Oral (EMI)	DDD	931	0	183	146		784	10
Total	DDD	35343	57785	363	3064	7415	21399	259

2013								
Parenteral (WHO)	DDD	13346	37928	0		77674	418	37
Parenteral (EMI)	DDD	0	8957	980		550	18739	
Oral (WHO)	DDD	27552	4332	958	17271			20
Oral (EMI)	DDD	742		57	1035		4130	
Total	DDD	41640	51217	3010	18306	78705	23287	57

problems is 3164, A07 Antidiarrheals, intestinal antiinflammatory/antiinfective agents is 22835, A11 Vitamins is 99777, A12 Mineral supplements is 31509, A16 Other alimentary tract and metabolism products is 1396 DDD.

Total annual consumption in DDD of drugs group A Alimentary tract and metabolism for parenteral and oral use in EMI in the period of 2009 – 2013 years is shown in table 5.

From total number of DDD consisting in each subgroup the parenteral form (DDD and DDD(EMI)) represented in

sequence by years are 85.7% in 2009, 83.6% in2010; 77.5% in 2011; 76.7% in2012; 72.8% in 2013 and oral form (DDD and DDD(EMI)) respectively 14.3%; 16.4%; 22.5%; 23.3% and 27.2%.

To determine the DDD/1000 during the evaluated period, was taken into account the following data: the number of patients treated in the institution (except those who have no insurance policy and pay for treatment), which in 2009 was 20 946 patients, the median duration of treatment 8.62 days,

Table 5

Total annual parenteral and oral form consumption in DDD of Alimentary tract and metabolism drugs in Emergency Medicine Institute in the period of 2009 – 2013

Administered form	Measure unit	2009	2010	2011	2012	2013
Parenteral (WHO)	DDD	71884	182998	203247	86238	129403
Parenteral (EMI)	DDD	7091	29263	31463	9961	29226
Oral (WHO)	DDD	12269	35067	58662	27333	53087
Oral (EMI)	DDD	876	6621	9645	1913	6165
Total		92120	253949	303017	125445	217881

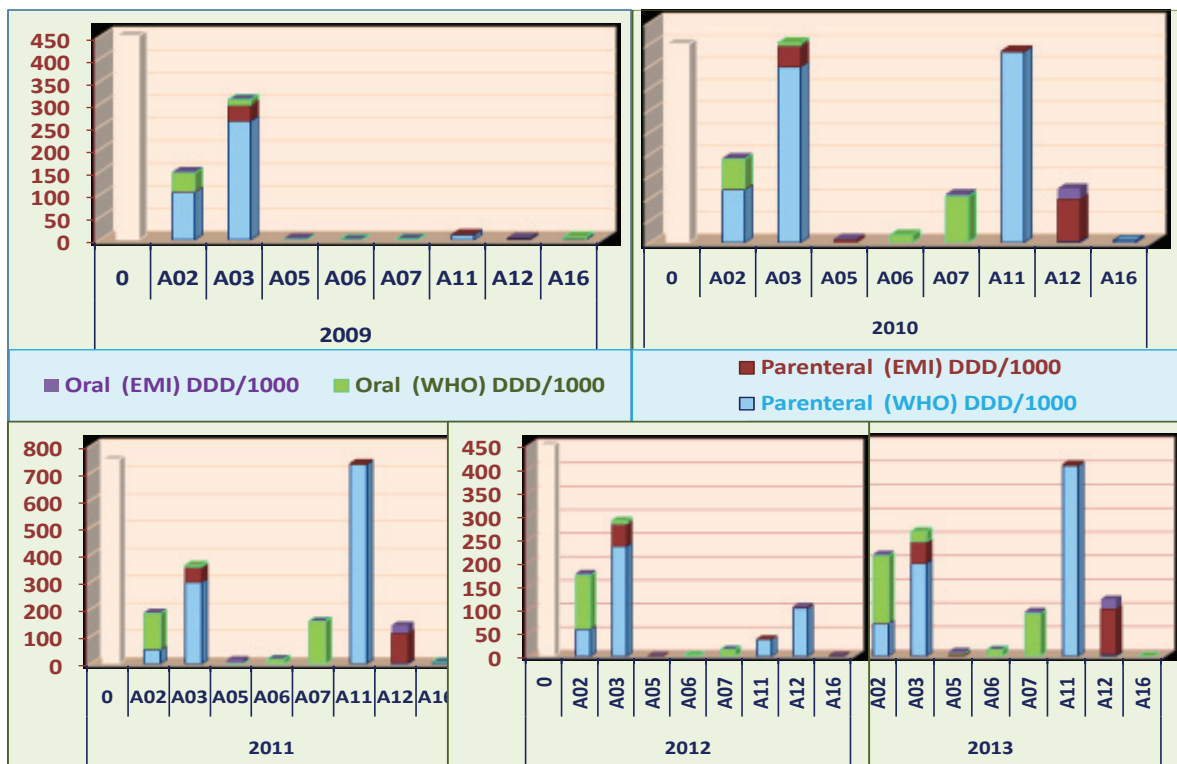


Fig. 5. Total annual parenteral and oral form consumption in DDD/1000 of subgroups alimentary tract and metabolism drugs in Emergency Medicine Institute in the period of 2009 – 2013.

which amounts to 188 762 days/bed; in 2010 their number was 21 341, and the median duration of treatment 8.64 days, which amounts to 191 556 bed/days; in 2011 was 19 913 patients and the median duration of treatment 8.66 days, which amounts to 186 246 bed/days; 2012 was 20 664 and the median duration of treatment 8.82 days, which amounts to 199 816 bed/days, and, in 2013 respectively was 20 830 with a median treatment duration 7.8 days, which amounts to 193 019 bed/days [16].

As one can see from figure 5 in the investigation period the consumption of DDD/1000 more than 100 units were registered for the following subgroups: A02 Drugs for acid-related disorders, A03 Drugs for functional gastrointestinal disorders, A07 Antidiarrheals, intestinal antiinflammatory/antiinfective agents, A11 Vitamins and A12 Mineral supplements. The consumption of DDD/1000 of oral form for subgroups A02 Drugs for acid-related disorders and A07 Antidiarrheals, intestinal antiinflammatory/antiinfective agents have been constantly increasing over the evaluated period from 44.4 and 1.8 units in 2009 to respectively 146.5 and 94.8 units in 2013.

The total annual parenteral and oral form consumption of DDD/1000 of drugs Alimentary tract and metabolism group in EMI, for the period of 2009 – 2013 is presented in figure 6.

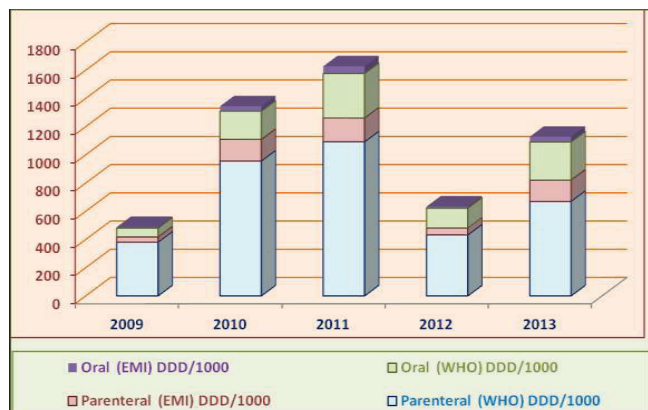


Fig. 6. Total annual parenteral and oral form consumption in DDD/1000 of alimentary tract and metabolism drugs in Emergency Medicine Institute in the period of 2009 – 2013.

A considerable difference between the total DDD consumed per 1 000 occupied bed/days for the period under evaluation can be observed from figure 6. And, if that consumption in 2009 was considered as 1 unit, then this report for 2010 would be 1: 2.75, for 2011 = 1: 3.33, for 2012 = 1: 1.3, for 2013 = 1: 2.31. To assess the cost of one DDD/1000 per year, we divided the value in “Lei” spent by the number of DDD consumed and multiplied by the number of DDD/1000 occupied bed/days determined per year. So in 2009 the cost of DDD/1000 was 5180.7 lei (999 195 lei: 94 120 x 488); in 2010 was 4878.0 lei (921 691 lei: 253 949 x 1344); in 2011 was 4571.2 lei (851 359 lei: 303 017 x 1627); in 2012 was 4397.1 lei (871 386 lei: 125 445 x 633) and in 2013 was 5397.5 lei (1 042 562 lei: 217 881 x 1128).

Conclusions

1. The obtained data reveals that from 3 basic characteristics of drug consumption [index value, natural indicators (grams), natural indicators DDD], DDD is the most objective and can be considered as the cornerstone for making decisions on determining the needs and organization of rational use of medicines, that in practice means implementation of the “Drug Statistics Methodology” of WHO Collaborating Centre in the Republic of Moldova, first of all in hospital institutions.

2. Taking as a starting point 2009 year the overall assessed consumption of medicinal remedies was presented in:

- index value (lei) of 999 195 lei, the percentage in 2010 amounted to 92.3% (921 691 lei), in 2011 to 85.2% (851 359 lei), in 2012 to 87.2% (871 386 lei) and in 2013 to 104.4% (1042562 lei), or a variation for the evaluated period of 19.2% (from -14,8% to 4.4%);
- natural indicators (grams) of 123479 grams in 2009, which in 2010 amounted to 89% (109510 grams), in 2011 to 110.7% (136712 grams), in 2012 to 133.6% (165019 grams) and in 2013 to 117.5% (145 092 grams) or a variation for the evaluated period of 44.6% (from - 11% to 33.6%).

3. Total number of DDD consisting in each subgroup is 94 120 in 2009, to 253 949 in 2010, to 303 017 in 2011, to 125 445 in 2012 and to 217 881 in 2013, of these totals:

- The parenteral form (DDD and DDDEMI) represented in sequence by years is 85.7% or 78975, 83.6% or 212 261; 77.5% or 234 710; 76.7% or 96 199; 72.8% or 158 629;
- The oral form (DDD and DDDEMI) respectively 14.3% or 13 145; 16.4% or 41688; 22.5% or 68 307; 23.3% 29 246 and 27.2% 59 252.

4. The annual average consumption was recorded for: A02 Drugs for acid-related disorders of 35423 DDD, A03 Drugs for functional gastrointestinal disorders of 64297 DDD, A05 Bile and liver therapy of 2483 DDD, A06 Drugs for constipation problems of 3164 DDD, A07 Antidiarrheals, intestinal antiinflammatory/antiinfective agents of 22835 DDD, A11 Vitamins of 99777 DDD, A12 Mineral supplements of 31509 DDD and A16 Other alimentary tract and metabolism products of 1396 DDD.

5. The number of consumption DDD/1000 occupied bed days in the period under evaluation was:

- 488 in 2009, 1344 in 2010 or an increase of 275%, 1627 in 2011 or an increase of 333%, 633 in 2012 or an increase of 130% and 1128 in 2013 or an increase of 231%. The variation in the evaluated period was from minimal 1.3 times to maximal 3.3 times;
- the cost of one DDD/1000 that was respectively 5180.7 lei in 2009, decreases to 4878.0 lei in 2010, 4571.2 lei in 2011 and 4397.1 lei in 2012, respectively and increases to 5397.5 lei in 2013.

6. In order to fully assess drug consumption in DDD for medicinal remedies that WHO has not published, DDD based on the data of Emergency Medicine Institute were determined for 24 drugs.

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