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**DETERMINING THE VALUE OF A CENTRALIZED IODINE PREVENTION OF PRECARPATHIAN POPULATION**

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**Key words:** iodine deficiency, iodine medicines, antistrumin, marketing analysis, the solvency of iodine prevention.

**Summary**. An analysis of registration H03C group in the State Register of drugs in Ukraine was done. It found, that as of 01.01.2014, there were 6 registered drugs for the prevention of iodine deficiency, and 2 of them were produced abroad. As of 25.10.2014, there were only 3 drugs on the pharmaceutical market of Ukraine – Antistrumin (Darnitsya, Ukraine) Yodomaryn (Berlin-Chemie, Germany), Iodide (Farmak, Ukraine). The results of monthly monitoring of the average wholesale price show that their value in 2013 has not changed significantly. However, in March and April 2014 there was a sharp rise of prices (the average price of German drug Yodomaryn increased more than half), due to the introduction of 7% VAT on medicines, as well as the depreciation of the UAH at the foreign exchange market. The estimated average annual value of liquidity ratios indicate that the price range for such drug as Yodomaryn 200 mcg № 50, Berlin-Chemie, Germany, depending on the suppliers can’t be considered valid and ethical in relation to the solvency of the citizens of Ukraine. To ensure the needs of iodine prevention of total population at the expense of local budgets in Ivano-Frankivsk region, it should be provided 8 million 557 thousand UAH. In the presence of state deficits of local regional budgets it is reasonable to recommend funding for the prevention of endemic goiter at least for children fewer than 14 years old, in which Ivano-Frankivsk region should provide 1,010,238,24 UAH.

 **Introduction.** Since thyroid hormones have universality and multifunctionality of their action, insufficiency of their main component (iodine) causes not only the thyroid pathology, but also a wide range of pathological disorders, which are called iodine deficiency disorders. These violations are the result of the following factors: deficient of iodine in water, soil and foodstuffs [2, 4-6]. Therefore, the deficiency of this microelement is typical for large areas of the planet. Violations that arise as a result of these disorders are relating to all groups of population and cover a variety of conditions caused by its deficiency [2, 3, 5-10]. Iodine deficiency is an actual problem for the whole territory of Ukraine, including Ivano-Frankivsk region. Therefore, study of the pharmaceutical market for the prevention of iodine deficiency disorders and also identifying the need for these drugs for centralized prevention of this disease for Ivano-Frankivsk region is an urgent task today. The purpose of study was to carry out a retrospective marketing analysis of H03C group of drugs, which were present in the national market in 2013-2014, and also identifying the need in the most affordable drug for the prevention of iodine deficiency by the expense of local budgets of Ivano-Frankivsk region.

**Materials and methods.** Methods of marketing analysis for determination the status and dynamics of the market of drugs for the prevention of iodine deficiency and method pharmacoeconomic analysis «total cost of prevention».

**Results and their discussion.** Since the medicines for the prevention of iodine deficiency are relating to OTC, the solution of this problem has been given under the curation of the first-table pharmacists. According to the Protocol of pharmacist during dispensing of OTC-medicines for the prevention of diseases caused by iodine deficiency, which regulates by the order of Ministry of Healthcare of Ukraine from 10th November, 2013 № 875, for this purpose are used medicines with the active ingredient potassium iodide [1]. The analysis of registration of the H03C group in the State Register of drugs Ukraine has been done. It found that as of the 1st January, 2014 there were registered 6 drugs for the prevention of iodine deficiency: Iodomaryn (tab. 100 mcg, 200 mcg, №50, №100, Berlin-Chemie, Germany), Antystrumin (tab. 100 mcg №50, as well as tablets 1 mg №50, №100, Darnitsya, Ukraine), Potassium iodide (tab. 250 mg №10, Monfarm, Ukraine), Iodine-normil (tab. 100 mcg, 200 mcg, №50, Kyiv Vitamin Factory, Ukraine), Iodide (tab. 100 mcg, 200 mcg, №50, Farmak, Ukraine) Iodovital (tab. 100 mcg, 200 mcg №96, Unipharm, USA). However, the pharmaceutical market in 2014 offers only 4 drugs (Iodine-normil (tab. 100 mcg, 200 mcg, №50, Kyiv Vitamin Factory, Ukraine), and Iodovital (tab. 100 mcg, 200 mcg №96, Unipharm, USA were absent). From September 2014 the market of medicines of Ukraine had left the drug potassium iodide (Monfarm, Ukraine).

Fig. 1 shows the results of monthly monitoring of the average wholesale price for the 2013 and 2014 according to the «Weekly journal» Pharmacy». According to the results the analysis, the wholesale prices of medicines in 2013 were relatively stable. Particularly, the price of the drug potassium iodide (tab. 250 mcg №10, Monfarm, Ukraine) has remained at 12,75 UAH, and only in December decreased to 11,94 UAH. However, in March and April 2014 there was a sharp rise in prices (the average price of German drug Iodomaryn increased by more than half – from 31,57 UAH in February 2014 to 48,47 UAH in April 2014) due to implementation of the 7% VAT on medicines and also depreciation of the UAH on foreign exchange market.



Fig. 1. Dynamics of the wholesale price of one packaging of H03C group of for 2013-2014 (UAH).

By number of suppliers the leaders of the group were Yodomaryn (Berlin-Chemie, Germany) – 41 wholesale firms and Iodide (Farmak, Ukraine) – 40 firms accordingly in 2013. For comparison, in 2014 the number of suppliers has significantly decreased, but their quantity of the drug potassium iodide (Monfarm, Ukraine) didn’t change (fig. 2, 3).

Fig. 2. Number of suppliers the H03C group of drugs on the pharmaceutical market of Ukraine in 2013.



Fig. 3. Number of suppliers the H03C group of drugs on the pharmaceutical market of Ukraine in 2014.

The next stage of research was to determine the liquidity ratio for drugs of H03C group. The estimated annual average value of liquidity ratios is shown on the fig. 4. They indicate that the greatest liquidity have the prices for the drug Iodomaryn 200 mcg №50, Berlin-Chemie, Germany. Therefore, the range of variation in its price depending on the suppliers cannot be considered as valid and ethical in relation to the solvency of the citizens of Ukraine.

Recommended socially oriented limit of the liquidity ratio (0.3)

 Fig. 4. Calculated average numbers of liquidity ratios of prices for drugs of H03C group in 2014.

 On the next stage of research, we calculated the cost of unit dosage of medicines for prevention of iodine deficiency, taking into account the fact that they were purchased at the expense of the local budget. Prices were topical on the 25th October, 2014. Calculated values are presented in the fig. 5.



 Fig. 5. The cost of 100 mcg of different analogues of potassium iodide, which were present in the pharmaceutical market of Ukraine on the 25th October, 2014.

 Thus, fig. 5 shows that the drug Antystrumin (1 mg № 50, Darnitsya, Ukraine) at a dosage of 100 micrograms is the most accessible for the general prevention of iodine deficiency.

Taking into consideration that Precarpathian belongs to the endemic regions of Ukraine we calculated the cost of iodine deficiency prevention for the different age groups.

Since the term of proper prevention of iodine deficiency disorders cannot be less than six months (180 days) [2, 5], it was determined the cost of prevention of the most affordable medication for people Antystrumin (1 mg № 50, Darnitsya, Ukraine) per person depending on age group (Table 1).

*Table 1*

**The cost of iodine deficiency prevention by Antystrumin (1 mg № 50, Darnitsya, Ukraine) for different age groups of population per person.**

|  |  |  |
| --- | --- | --- |
| **Medicine** | **Cost for children from 0 to 14 years** | **Cost for adults (from 15 years)** |
| Antystrumin 1 mg №50 | 4,38 UAH | 6,58 UAH |

On the next stage of pharmacoeconomic research using «total cost of prevention» method was calculated need for financing of iodine prevention by Antystrumin (1 mg № 50, Darnitsya, Ukraine) in Ivano-Frankivsk region, taking into account the number of inhabitants by age groups.

Information-analytical center of the Ivano-Frankivsk region shows that as of the 1st January, 2014 in Ivano-Frankivsk region lived 230,648 persons aged less than 14 years and 1,148,414 persons aged more than 15 years.

*Table 2*

**The cost of iodine deficiency prevention in Ivano-Frankivsk region by Antystrumin 1 mg № 50 for all citizens**

|  |  |  |
| --- | --- | --- |
| **Medicine** | **Cost of prevention for children from 0 to 14 years, UAH** | **Cost of prevention for adults (from 15 years), UAH** |
| Antystrumin 1 mg №50 | 1 010 238, 24 | 7 556 564,12  |

So, totally, to reach semi-annual prevention of iodine deficiency disorders for inhabitants of Ivano-Frankivsk region, the local budget should spend almost 8 million 557 thousand UAH.

**Conclusions.** The analysis of national market H03C group of medicines found that there are currently 6 drugs of potassium iodide in various dosage forms registered in Ukraine. However, as on the 25th October, 2014 there were only 3 drugs on the market. Their price analysis identified the stability of the wholesale price of drugs during 2013 and a sharp jump in prices in March-April in 2014. The most accessible drug for the prevention of iodine deficiency for the population has been identified the drug Antystrumin (1 mg № 50, Darnitsya, Ukraine). To ensure the needs in the iodine prevention for total population of Ivano-Frankivsk region at the expense of local budgets it should be spend 8 million 557 thousand UAH. In the presence of local regional budget deficit it is reasonable to recommend funding the prevention of endemic goiter at least for children younger than 14 years. Thus, it should be spend 1,010,238, 24 UAH for Ivano-Frankivsk region.

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