

# ANALYSIS OF RELATIONSHIP BETWEEN OTC MEDICINE CONSUMPTION AND PATIENT CARE EXPENDITURES

Gergő Tömöri <sup>1\*</sup>

<sup>1</sup> Department of Finance and Accounting, Faculty of Economy Sciences, University of Debrecen, Hungary

---

## Keywords:

health  
expenditures  
consumption  
OTC  
drugs

## Article history:

Received 31 Jan 2016  
Revised 28 Febr 2016  
Accepted 31 March 2016

---

## Abstract

*Hungary is at the forefront as regards occurrence of diseases, which would be preventable by continuing consciously lifestyle. Thereby, in the long run expenditures those spend for medical care would be saved in government level. At the same time, not all forms of disease prevention able to cause beneficially effect proved statistically. My starting hypothesis is about that in Hungarian regions where the number of diseases is lower due to the health-conscious lifestyle, so the OEP financing due for the lower case numbers per capita, relatively more money is spent on non-prescription (OTC) drug consumption, namely total household expenditures spending on pharmaceuticals are higher than level which could be assume based on the number and frequency of morbidity. I have concluded that the role of self-medication inside of drug consumption is not influence the regional medical care expenditure per capita.*

---

## 1 Introduction

According to the WHO estimates, within the group of non-communicable diseases the majority of death cases are still caused by cardiovascular diseases, "its proportion was more than 40% of the all mortality in the developed countries at the beginning of the new millennium" [1]. Among them Hungary belongs to countries characterized by high risk of diseases. As a result, if the prevention in population level would be a prominent role, thus it can couple with financial impact to the budget of health care system. However Ádány [2] highlights the paradox of prevention: although in relation to the population would be very effective, for the individuals involved in it is rarely perceived such direct, personal advantage. Although "in explanation of macro- and micro-level allocation decisions in health care, the impact to expenditures can only be included in second place" [3], many people believe that scarcity of finite resources limits the opportunities for maintaining health.

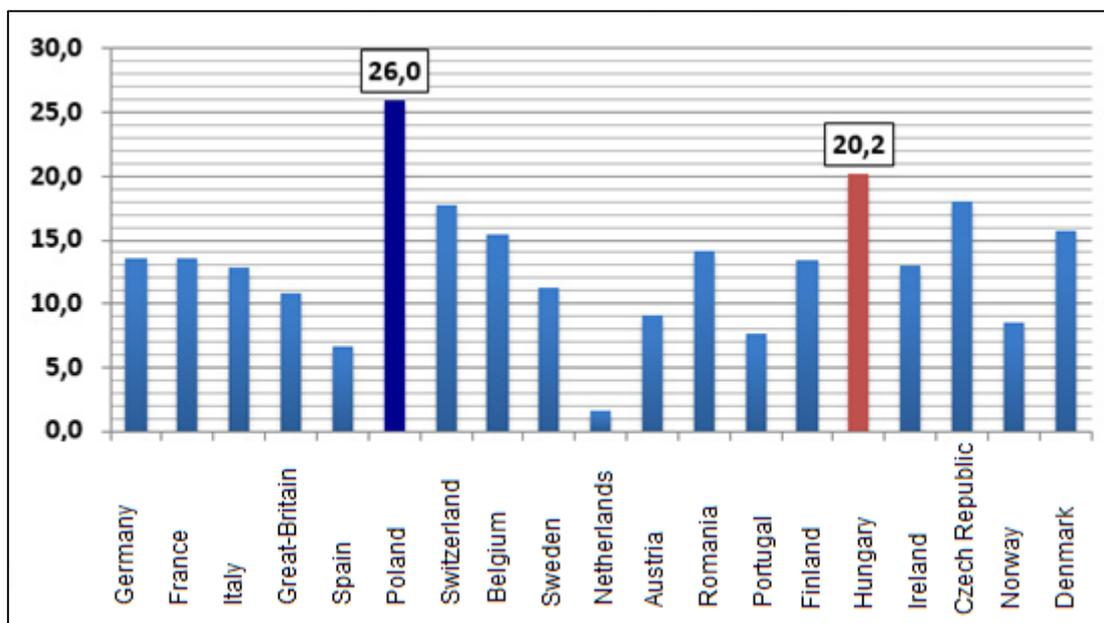
Treatment of disease prevention as priority for a population where lifestyle habits different significantly from that required by the health protection, reallocate of significant part of scarce resources (spendable income, free time) is necessary. In turn this can only be next to resignation from satisfy of certain individual needs those member of population or postpone, either try to achieve with consumption of additional products typically that can include extra spending avoiding the perceived difficulties associated with lifestyle change, depending of the possibilities and the adherence to former habits. Within the pharmaceuticals market, this phenomenon manifests mostly in turnover of drugs obtained without a prescription (can be sold outside pharmacies, from initials of "Over the counter" OTC).

According to Kaló [4] this latter part of pharmaceutical turnover calculated in free market price entails the biggest uncertainties among estimates associated with the pharmaceutical

---

\* Corresponding author. Tel.: +36 308 737 033  
E-mail address: tgerg2@gmail.com

spending of households. In the early 2010s, IMS Health “predicted world drug market slowdown in the growth, only 3-6% market growth” [5]. Within the Hungarian pharmaceutical market in 2013, “the total drug sales with the outsides pharmacies 5-6 billion Ft sales calculated on consumer prices, and the hospital medicine turnover 144-146 billion Ft calculated on producer prices approached the 730 billion Ft” [6]. As it can see in *Figure 1* the rate of turnover of OTC medicines is the second largest following Poland in the EU in third quarter of 2014.



*Figure 1. Rate of OTC drug turnover within the total medicine turnover.*

*Source: MAGYOSZ, IMS Health, 2015.*

The increase in sales of OTC medicines promoted the fact that "in recent years, pharmacies have become interested in optimizing their economic situation, the gross margin loss caused by the prescription drugs is tried to compensate with recommendation of drugs those can enable without prescription and has higher margin" [7].

## 2 Material and method

My starting hypothesis is that self-medication may contribute to decrease of patient care expenditures through health consciousness, namely, in those regions where the health situation of population is better the OTC pharma consumption is relatively higher too. "The epidemiological research tested on health state of population usually based on relative numbers, however it measure the »sickness« and not the »health« state" [8], such as the prevalence of certain diseases or the number of deaths. On my study the comparison of health status of regions realized through National Health Insurance Found (OEP) financing after the incidence of patient care of health care providers for each region. The analysis is based on regional data collection related to the Central Statistical Office for domestic consumption and data from National Health Insurance Found (OEP) related to health producer financing and reimbursed medicine turnover.

Since the National Health Insurance database covers only prescription pharmaceuticals turnover, furthermore the Central Statistical Office's data on household consumption makes no distinguish between prescription and non-prescription medicines expenditure, the OTC drug market values can calculated by difference of pharmaceutical expenditure per capita recognized in regional level and prescription tuition fee turnover of pharmaceutical products per capita (on consumer prices reduced grant amount). It expresses the following equation, where OTC is the consumption of medicine without prescription.

$$OTC = Total\ drug\ consumption - Turnover\ of\ tuition\ fee\ of\ prescription\ drugs \quad (1)$$

Patient care costs calculation based on regional summaries of OEP amounts of aid assigned to medical services registered in the country level. The cost data has calculated after adjusting for health care inflation, on data base of 2006, without a reimbursement of pharmaceutical products, because the purpose of this research limits only to the impact of OTC pharma product consumption, which are not supported by the Social Insurance. The investigation of relationship between drug consumption and cost of patient care realize used by SPSS, regression and analysis of variance (ANOVA) method.

### 3 Results

The household expenditures inverted to OTC drugs per capita increase by 10.9% nationwide compared to 2006, in the following 8 years in average, while the trend of sales growth fell only in 2010 in all regions, partly due to the economic crisis, in part due to the fact that a significant increase in traffic in all regions in 2009 resulted in a high base data. The Hospital Association's analysis published in 2014 explains the national turnover growth in OTC segment occurring despite becoming prescribed Algopyrin, the change of support and prescribing system. The cost of patient care calculated on base prices of 2006 shows declining trend in accordance with changes in the rate of OTC pharmaceutical expenditure, there was increase only in 2010 and in 2013 in national level.

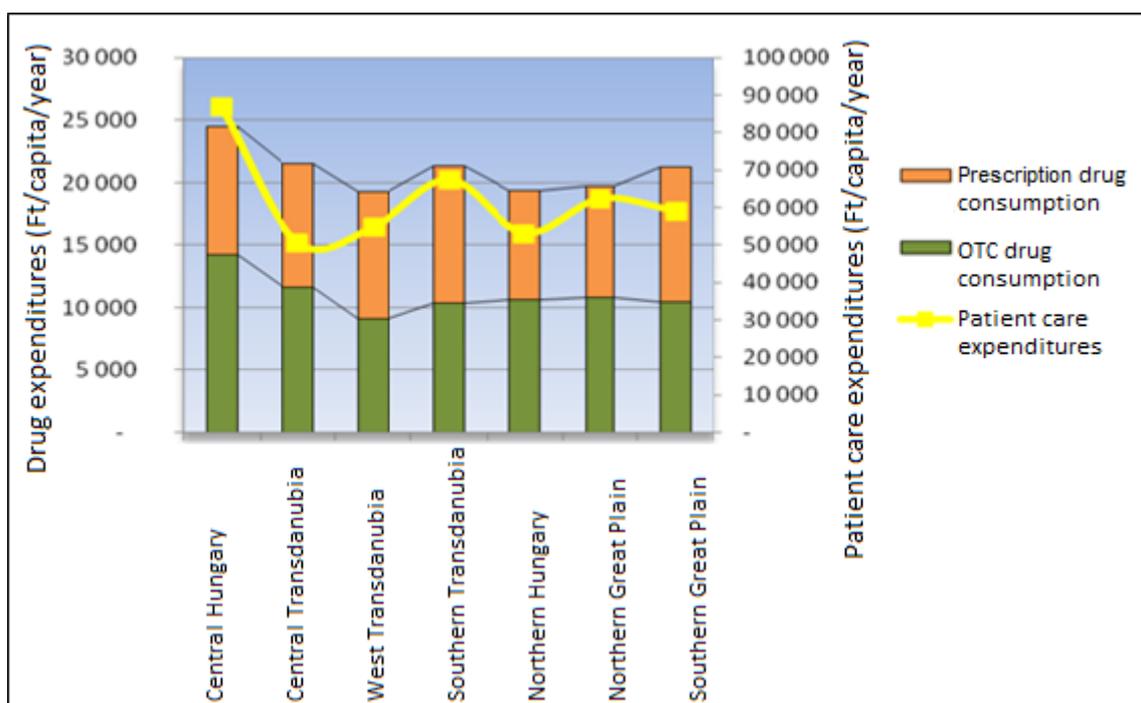


Figure 2. Annual average of medicine expenditures per capita and cost of patient case in the Hungarian regions (2006-2013). Source: own edition.

Based on analysis of regional data it can show that the cost of patient care similar to the consumption of OTC drugs per capita is the highest in the Central Hungary region. Since the impact of population in different regions filtered in per capita indicators, outstanding value typical of this region can explain not with population approximating third of the country's total population, neither with, but mainly with economic and development indices and higher disposable income per capita relative to other regions, which can enable on the one hand easier availability of OTC medicinal products, advanced infrastructure network for health services, on the other hand a relatively higher level of demand for pharmaceutical products in OTC segment. The outstanding value of cost of patient care per capita also implies that funding case number is higher than value justified by population, so the higher frequency of occurrence of diseases can be traced back to the

differences in lifestyle due to the improved economic-infrastructure environment. This was not able to offset by rate of 58% of OTC medicine expenditures within the total medicine expenditures per capita in the examined eight years after 2006. The total spending on drugs and within that, the size and proportion (47%) of OTC drug expenditure in West Transdanubia region showed the lowest value, since the cost of patient care per capita in South Transdanubia region is the biggest.

The consumption of prescription medicines per capita exceeded at annual average the consumption of OTC medicines only in West and South Transdanubia region, in South Great Plain their size was only slightly different from each other. If we examine only the impact of OTC medicine consumption, so based on results of variance analysis – which summarized in *Table 1* – the null hypothesis, related to the lack of connection between the level of regional self-medication and costs of patient care can be accepted, because the F significance (5.3%) value expressed by probability of incorrect rejection of the null hypothesis is higher than significance level of 5% that assumed in the model. Therefore, there is no significant difference between costs of patient care in terms of regional differences of OTC pharmaceutical expenditures.

*Table 1. Results of variance and correlation analysis.*

	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change statistics				
					R Square change	F change	df1	df2	Sig. F
Model 1	.748*	.560	.472	8974.549	.560	6.359	1	5	.053
Model 2	.811**	.658	.488	8838.698	.099	1.155	1	4	.343

\*Predictors: (Constant), OTC drug consumption

\*\*Predictors: (Constant), OTC drug consumption, Prescription drug consumption

Source: own edition by using SPSS.

At the same time, however this difference is small enough in order to the close of relationships between the former two factors has not been confirmed that, whereas the correlation coefficient shows a relatively high value (0.75). This slightly strong relationship is also supported by that OTC drug turnover explains a variance of cost of patient case in 56%.

*Table 2. Results of regression analysis*

	Coefficients	Standard error	t value	p-value	Bottom 95%	Top 95%
Intercept	-1611.17	25459.8401	-0.063	0.952	-67057.7	63835.44
OTC drug consumption	5.76796	2.28739	2.52	0.053	-0.1119	11.6479

Source: own edition

According to data arise from regression statistics if OTC medicine consumption misses, it can save more expenditure in the field of health care: a change of Ft 1 in the household spending for medicines without prescription causes in average more than growth of Ft 5 in health care expenditures at National Insurance, however the relatively high p-value does not confirm the accuracy of that.

## 4 Conclusions

All in all, from analysis of composition of pharmaceutical market turnover and from results of variance analysis it can be concluded that the OTC drug consumption itself, significantly has not affected the development of health expenditures, namely consumption of OTC medicine products should not replace alleged difficulties associated with lifestyle change that is needed: with higher self-medication could reduce significantly nor the probability of occurrence of diseases, neither the number of cases nor funding. So the government would only be able to save more health expenditures through prevention, if it would take people interested in lifestyle changes (for example in nutrition, sport) instead of changes of drug consumption habits.

## References

- [1] Czuriga, I. 2002. Az iszkémiás szívbetegeés megelőzése. Kardiológia. Hippocrates, Vol. IV. (Nr. 4) p. 260.
- [2] Ádány, R. 2011. Megelőző orvostan és népegészségügy, Debreceni Egyetem, Debrecen. p. 39.
- [3] Kaló, Z. Bors, K. Dank, M. et. al., 2009. Együtt az egészségért, Az életminőség mérésének jelentősége a bizonyítékokon alapuló egészségpolitikai döntéshozatalban. In: Orvostovábbképző Szemle, Vol. 16. (Nr. 9) pp. 12-14.
- [4] Kaló, Z. Merész, G. Mezei, D. Tóth, Á. Inotai, A. 2012. Hazai gyógyszerkiadások nagysága. A Széll Kálmán Terv gyógyszerágazati fejezetének szakmai megalapozottsága és következményei. Syreon Kutató Intézet, Budapest. p. 17.
- [5] Feller, A. 2011. A magyarországi gyógyszernagykereskedelem helyzete és jövőképe. Egészségügyi Gazdasági Szemle, Vol. 49. (Nr. 6) pp. 33-52.
- [6] Haiman, É. 2013. Tovább nőtt a gyógyszerpiac. [Online]. Available: <http://www.vg.hu/vallalatok/egeszsegugy/tovabb-nott-a-gyogyszerpiac-423964> [Accessed: 17-Aug-2015].
- [7] Náthly, V. 2014. Optimista kilátások. 2014-es patikapiaci körkép. [Online]. Available: <http://www.magangyogyszereszek.hu/ax/axpid1.php?pid=678> [Accessed: 19-Aug-2015].
- [8] Forgács, I. 2000. Az egészség ára. Magyar Tudomány. (Nr. 9) pp. 1113-1119.