A STUDY ON ANTI-DIABETIC DRUG DELIVERY FROM PHARMACIES

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ABSTRACT. During 2004-2006 anti-diabetic drug delivery was done through centralized procedure, national auction just through hospital pharmacies. Starting with October 1st, 2006, their delivery has decentralized through community pharmacies. The present study was carried out through 100 questionnaires in pharmacies in 6 counties from the North-Western part of Romania. The study shows that both urban and rural pharmacies deliver both oral anti-diabetic drugs and insulin’s. Aspects such as: preferred distributors, time of delivery, the most requested products, collaboration between physicians and pharmacists, pharmacists’ grievances, communication with patients etc have been identified.

Keywords: antidiabetic brands, drug delivery, pharmacy channel

Introduction
The questionnaire is a tool used for identifying various problems, determining the clients’ degree of satisfaction as well as for correlating the various market data resulted from different studies. Currently, the delivery of hypoglycaemic drugs is done through urban or rural open-circuit pharmacies. This system of delivery, which has been into practice since 01.10.2006 for OADs (oral

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antidiabetics) and respectively 01.05.2007 for insulins, provides the patient with a wider access to medication.

The starting point of this study was the idea that by questioning pharmacists, essential information on the main anti-diabetic drugs, their supply, collaboration with physicians and pharmaceutical stores as well as the pharmacists’ main complaints on their delivery can be obtained. The target was the North-Western part of the country which was to be covered as significantly as possible.

**Materials and methods**

This stage implied the designing of a questionnaire for pharmacists acting in the network of open-circuit pharmacies, a questionnaire structured in four parts:

A) General information on the city and the length of service of the questioned pharmacist (questions 1-2);

B) Drugs delivered at the work place (questions 3-7);

C) Collaboration with distributors and problems in drug acquisition (question 8-11);

D) Identifying the extent to which the patients are informed (question 12-13).

The questions were of open type (free answer), closed (multiple choices) or mixed (free answer and multiple choices).

**Sampling**

The sample chosen for questioning was represented by 100 pharmacies from 33 cities of 6 counties from the North-Western part of the country: Bihor, Bistrița Năsăud, Cluj, Maramureș, Satu Mare și Sălaj. According to the data presented in Table 22, these counties represent approximately 13% of the Romanian population (2.74 millions inhabitants) and approximately 13% of the patients suffering form diabetes in Romania (51,000 patients). The average prevalence of diabetes in the population of these counties is of 1.87% (similar to the one on the national level): Bihor (2.51%), Bistrița Năsăud (1.01%), Cluj (2.19%), Maramureș (1.46%), Satu Mare (1.66%), and Sălaj (1.63%).

These six counties were chosen on the basis that drug distributors have a regional organization and the chosen area could represent the area of coverage of one or more important distributors on this segment. Moreover, the 640 pharmacies in contractual relationship with the Health Insurance National Board represent approximately 15% of the pharmacies in Romania. [1-6] There is a symmetrical spread of the population in the chosen area (3 big counties and 3 small counties). There are also two university medical and pharmaceutical centres (Cluj-Napoca and Oradea). The number of questionnaires distributed in the territory was as follows:

→ Bihor: 27;
→ Bistrița Năsăud: 10;
→ Cluj: 27;
The questionnaires were handed between 15 January and 20 February 2008 and were answered in a proportion of 65%. The sample is not representative for Romania but because of the high rate of answer is representative for the area in question. The present research was also qualitative and not quantitative.

Question number 4 was a check point for the questionnaires’ validation.

The used method was investigation on questionnaires and the descriptive statistical analysis of the results was carried out in Microsoft Excel.

**Results and discussions**

According to the data from the sites of the Health and Social Insurance County Boards (Bihor, Bistrița-Năsăud, Cluj, Maramureș, Satu Mare și Sălaj), the number of pharmacies in contractual relationship with the questioned area at the date of the study was of 640. [1-6]

![Figure 1. The number of pharmacies in contractual relationship with the Health Insurance County Boards (n=640)](image-url)

The number of questioned pharmacies was of 65, meaning 10.2% of the total number of pharmacies in the area.

A) General information on the city and the length of service of the questioned pharmacist (questions 1-2);

The answer to question 1 showed that out of the total number of places, 33% are rural areas (11 out of 33) and the percentage of pharmacists in the rural areas was of 20% of the total questioned (13 out of 65).
The answer to question 2, *Your experience in the pharmacy* proved that:

a) The majority of the questioned pharmacists have a length of service higher than 5 years (81.5%);
b) 11 pharmacists (16.9%) have between 1-5 years experience in pharmacies;
c) 1 pharmacist (1.5%) has an experience < 1 year.

B) Drugs delivered at the work place (questions 3-7);

The first question of this questionnaire was meant to identify the percentage of pharmacies which do not delivery any anti-diabetic drug as well as the ones that do not delivery insulins and their repartition according to the area.

All the pharmacists deliver oral anti-diabetics and only 78.5% deliver insulins too. Out of the ones that do not deliver insulins 9 (64.3%) come from urban areas and 5 (35.7%) from rural areas.

If in urban areas the percentage of pharmacies that do not delivery insulins is of over 82% (43 pharmacies), in rural areas this is of only 61.5% (8 pharmacies),
which can be seen as a hitch in the patients’ access to medication. As all the pharmacies delivery oral drugs, the absence of insulins from pharmacies can be accounted for by the fact that patients get the insulin from other pharmacies, especially the ones located in urban areas or the questioned pharmacies do not benefit from appropriate insulin storage conditions.

Question 4. *How often are these types of products requested?* was a check point for verifying the accuracy of the answers through the introduction of the word *never*. If the pharmacies had answered to the previous question with *none* and to this question their answer was different from the above-mentioned one, the questionnaire was no longer valid and had to be eliminated. As there was no such situation, all questionnaires were validated.

The answers were as follows:
- Daily: 31 – 47.7%;
- 2-3 days: 19 – 29.2%;
- Weekly: 8 – 12.3%;
- Monthly: 6 – 9.2%
- Very rarely: 1 – 1.5%
- Never 0 - 0%

The data shown above prove that only 10.7% of the pharmacies occasionally delivery these drugs. This is a proof for the fact that there is an important decentralization of the diabetes sub-programme and a good coverage on the level of pharmacies.

By analysing the data resulted from question 5 it can be noted that just 9 International Nonproprietary Names (substances) – INN, were mentioned (including a fixed combination), and the most frequently delivered ones are *sulfonylureas* (39.8%), *biguanides* (38.8%), *fixed combinations* (19.9%) and in a reduced percentage (0.5%) *α-glucosidase inhibitors, glucosidase, glinides and thiazolidindiones*. From the class of *biguanides*, the only mentioned representative was *metformine*, which indicates its high frequency in medical prescriptions. In the class of *sulfonylureas* just 3 representatives have significant percentages *glibenclamide, glimepirid* and *gliclazid*.

By extending the analysed sample to a national leve,l with a probability of 95% it can be stated that between 15.02 and 64.58% of the pharmacies prefer *sulfonylureas*, between 14.02 and 63.58% *biguanides* and between 4.88 and 44.68% *fixed combinations*.

The request for biguanides and fixed combinations which contain biguanides in a percentage of 58.7% shows the fact that the majority of patients suffering from diabetes and treated with OADs are overweight or obese, these compounds being recommended to this type of patients.
Besides the above-mentioned facts, the answers to this question give useful information on the most prescribed brands. Thus, just 15 brands were named, out of which the first 5 are 89.8% of the total.

The results obtained for this question are in accordance with the data provided by the Health Insurance National Board in Top 50 on drugs quantitative consume in 2007 and respectively Top 50 on INN in 2007 (according to the value) for drugs from which the insurants from ambulatories benefited. According to the two tops published on the Health Insurance National Board site metformine occupies the 35th position in the value top of the first INNs delivered in 2007. In
the quantitative top of the first 50 drugs, the 5 products presented in Figure 7 were the most frequently prescribed in 2007. (Table 1) [7]

**Table 1.**

<table>
<thead>
<tr>
<th>Product</th>
<th>Questionnaire results (no. of pharmacies)</th>
<th>Position TOP 50</th>
<th>Units</th>
<th>Value of prescriptions (RON)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Siofor</td>
<td>71</td>
<td>6</td>
<td>76,381,677</td>
<td>18,180,404.95</td>
</tr>
<tr>
<td>Glibomet</td>
<td>39</td>
<td>26</td>
<td>30,085,812</td>
<td>9,450,471.70</td>
</tr>
<tr>
<td>Maninil</td>
<td>23</td>
<td>28</td>
<td>28,581,630</td>
<td>2,613,392.44</td>
</tr>
<tr>
<td>Diaprel MR</td>
<td>19</td>
<td>30</td>
<td>23,599,977</td>
<td>11,378,619.51</td>
</tr>
<tr>
<td>Amaryl</td>
<td>24</td>
<td>37</td>
<td>19,932,941</td>
<td>10,358,062.23</td>
</tr>
</tbody>
</table>

The only difference between the results of the study and the data presented by the Health Insurance National Board is the reverse positioning of Diaprel MR to Amaryl, a difference which can be explained through the similar values of both the number of questioned people as well as the number of UTs prescribed according to the Health Insurance National Board. It can be noted that although the two products are on the last positions from the quantitative point of view, they are on the 2nd and respectively the 3rd position from the qualitative one, after Siofor.

Another conclusion that can be drawn from the above-mentioned data is that just three out of the various producers of OADs on the Romanian market have products with a significant percentage (Berlin Chemie, Sanofi-Aventis and Servier). Moreover, at least one of the three brands of Berlin Chemie (Siofor, Maninil and Glibomet) is present in the answers of all the questioned people and all the three are 67.9% of the total answers.

Besides the above-mentioned information, it can be noted that the results are in accordance with the global tendencies. Thus, in a study carried out in Canada on 41,630 patients and published in 2001 it has been established that metformine (the only biguanide delivered in Canada) is the most prescribed OAD (65% of patients). [8]

The number of answers to question 6, *Make a top of the first 3 insulins most frequently requested* was 127. Relating this value to the number of pharmacies that release insulins it can be noted that the average number of answers per pharmacies was 2.49. This proves that there are pharmacies that release a small number of insulins.

The figure below shows the presence of insulins in prescriptions according to the producer. The most released insulins are Sanofi-Aventis (37.8%), followed by the ones produced by Eli Lilly (26.8%)
According to the type of insulin, the presence in pharmacies shows that the analogues represent 21.3% of the total answers, the analogue of long effect (Lantus) being the most frequently met (14.2%). This result is in accordance with Top 50 on INN in 2007 (according to the value) published by the Health Insurance National Board, which shows that human insulins are on the 17th position in this top, with a value of 36,108,588.98 RON, while glargin (Lantus), on the 40th position, registers a value of 17,411,100.14 RON. [7]
The human insulins most requested in pharmacies are *Insuman* (22.8%), *Humulin* (22%), *Mixtard* (21.3%) and *Actrapid* (9.4%). The last products belong to Novo Nordisk, which proves a repositioning of the company on the first place in the top of biosynthetic human insulins prescriptions. It must be mentioned that *Insuman* and *Humulin* contain preparates of rapid, basal effect as well as premixed preparates while *Mixtard* is just for premixed preparates and *Actrapid* just for insulins of rapid effect.

Question *Do you collaborate with physicians that prescribe antidiabetic drugs?* was addressed in order to identify the extent to which the pharmacies collaborate with physicians that prescribe antidiabetics. The present study shows that, unfortunately, over 50% of pharmacists have a very poor collaboration or even no collaboration at all with physicians.

![Figure 11. Pharmacist-physician collaboration (n = 65)](image)

C) Collaboration with distributors and problems in drug acquisition (question 8-11);

The results to question 8, *Do you collaborate well with the distributors that have offers on anti-diabetic drugs?* proved that there is a good collaboration on the *pharmaceutical store-pharmacy* segment, just 7.7% of pharmacists mentioning that they have a satisfactory collaboration with distributors.

At question 9, *Which is the insulin and oral anti-diabetic drug distributor you collaborate the best with?*, 8 pharmaceutical stores were mentioned. There were also a few cases in which there was no answer which meant that they had no preference (4.6%).
Among the preferred ones were Polisano (44.6%), A&A Medical (18.5%) and Mediplus (16.9%). The important distributors on the retail market are less appreciated for anti-diabetic drugs acquisition: Farmexim (3.1%), FarmaNord (3.1%), Montero (1.5%).

The main anti-diabetic drugs distributors in the period in which the contracts following the national auction in 2003 were being executed, namely Polisano, A&A Medical, Relad, Mediplus and Fildas are preferred for collaboration by community pharmacies too. The pharmaceutical stores that provided antidiabetics for hospitals, such as Europharm, Farmexpert and Dita are not mentioned by any of the questioned pharmacists. Moreover, in retail distribution, there are new pharmaceutical stores (Farmexim, FarmaNord and Montero).

OAD distribution to pharmacies is carried out mainly by distributors that have their own networks of pharmacies:
The first 6 above-mentioned distributors have insulins too in their portfolio.

It can be concluded that experience in the field of antidiabetics and especially insulins distribution as well as having networks of pharmacies are the two main factors that influence the pharmacies’ preference for distributors.

The correlation between areas and the distributors’ preference shows that just 5 out of the 8 distributors are preferred by pharmacies in rural areas, the percentage of preference on rural pharmacies versus total pharmacies being: Montero – 100%, Relad – 37.5%, Polisano – 20.7%, A&A Medical – 14.3% and Mediplus – 8.3%.

**Figure 14.** Preferences for distributors according to the area (n = 76)

In order to identify whether supplying is done in due time and whether patients have quick access to medication question 10 was introduced in the questionnaire: *The time in which the anti-diabetic drugs are delivered is...*

**Figure 15.** Drugs’ delivery time to pharmacies (n = 65)
Over 90% of pharmacies get their antidiabetics in 24h and 7.7% in about 3 days. Just 1 pharmacy answered that they get their drugs delayed (1 week) (figure 15). It can be noted that patients suffering from diabetes have quick access to medication and that distributors are prompt in meeting the demands.

The degree of pharmacists’ satisfaction and the main problems encountered in releasing anti-diabetic drugs were both studied through question 11: **What problems regarding OADs and insulins release do you encounter in pharmacy?**. For this question, fixed answers were given (financial conditions, payment date, delivery deadline, cashing money from the Health Insurance National Board) as well as the possibility to answer by other. Unfortunately, 14 pharmacists did not answer the question (21.5%) and the number of extra answers was just 4.

Financial conditions (the mark up that pharmacies can practice and the financial discount obtained from distributors) is the main problem raised by the pharmacies that answered (66.7%). This is due to the very low mark up (1.5%) practiced on anti-diabetic drugs and the reduced financial discount (around 5%). The deadline for bills’ payment to distributors and the cashing of the money from the Health Insurance National Board are other complaints (51% and respectively 19.6%).

There was only one pharmacist who complained about the impossibility of storing insulins in the situation of an order placed by a patient who refuses to get his medication from that pharmacy. Regarding the release of cartridge insulins and their unpacking by the pharmacy, there were 3 pharmacists who complained. They consider that the receipt should be written on the packing (box X 5 cartridges) or that delivery should be done in cartridges.

D) Identifying the extent to which the patients are informed (question 12-13).

Question 12, **On releasing OADs or insulins, are you requested for further information on the products by patients?** has a closed answer: Yes or No.

![Figure 16. Request for extra information by patients (n=65)](image)

It can be noted that there is a very high percentage (65.2%) of patients who do not request extra information from pharmacists. This can be explained through
the fact that diabetes mellitus is a chronic pathology, patients being used to the new
life style and the rules imposed by the illness.

Even if the percentage of pharmacists who are requested extra information
is quite low, the variety of answers is big. As formulated, the answers to this last
question of the questionnaire, The information requested by patients regards...,
focus on: way of administration and dosing (61.3%); side effects and contraindications
(12.9%); the cost for acquiring insulin syringes (3.2%); insulins maintenance (6.5%);
diet (6.5%); glycemia checking (3.2%); insulin pens (6.5%).

The last 3 categories of answers prove the fact that the patient considers the
pharmacist a source of complex services, able to provide useful recommendations not
only in the strict field of drugs but also regarding ways of improving daily life
quality. This is why it is important that a professional pharmacist should have
various knowledge, besides the one connected to his profession, obtained through
continuous training.

Conclusions
Both urban and rural pharmacies release OADs and insulins and their
supply is done mainly by pharmacies with experience in this field.

Most of the pharmacies release drugs within 3 days.
The most requested OADs are metformine, glibenclamide, glimepirid and
gliclazid as well as the fixed combination metformine 400 mg+glibenclamide 2.5 mg.
The most requested insulins are Insuman, Humulin, Mixtard and Actrapid,
and from analogues Lantus.

If on the level of the channel of distribution there is a good collaboration
between pharmacies and pharmaceutical stores, the situation is different as far as
the relationship pharmacist/physician is concerned.
The main pharmacists’ grievances are financial conditions, payment
deadline and cashing money from the Health Insurance National Board.
The communication between pharmacists and patients is not that good and
the main requests from patients regard way of administration, side effects and
drugs’ contraindications.

Although most of the questions asked by patients are concerning the drug,
there are situations in which the pharmacist has to give information on diet, insulin
pens and glycemia check.
REFERENCES


