

## RESEARCH ON THE FREQUENCY OF PHARMACEUTICAL PREPARATIONS IN THE COMMUNITY PHARMACIES OF CLUJ-NAPOCA

ANAMARIA BOBOIA\*, CONSTANTIN POLINICENCU

*Faculty of Pharmacy, „Iuliu Hatieganu” University of Medicine and Pharmacy Cluj-Napoca, 13 Emil Isac, 400023, Cluj-Napoca, Romania  
Pharmaceutical Legislation, Management and Marketing Department*

*\*corresponding author: aboboia@umfcluj.ro*

### Abstract

The present paper aimed to research the actual preparations in the community pharmacies of Cluj-Napoca, the amount and frequency of their preparation. The study implied the observation of 10 community pharmacies for 18 months between 1 January 2006 – 30 June 2007. The results have shown that there are great differences among the pharmacies with respect to the frequency of preparations, the amount and the type of preparations. The pharmacy on the first place has registered 413 compounding acts in 18 months compared to the pharmacy on the last place with only 45 compounding acts. The number of types of preparations (formulations) in the pharmacies under observation has been 40. Regarding the diversity of preparations, the pharmacy on the first place has prepared 28 types of formulations, while the pharmacy situated on the last place has made only 7 types of preparations. All the observed pharmacies have prepared: oxygenated water, Petrini paste and rivanol solution 1%. Other preparations in the majority of pharmacies have been: borax glycerine, ichtiol ointment, diluted alcohol, base III and menthol mixture, tincture of iodine 2% and Sabouraud's tincture.

### Rezumat

Lucrarea și-a propus să cerceteze care sunt elaborările preparate în momentul de față în farmaciile comunitare din Cluj-Napoca, în ce număr și cu ce frecvență. Activitatea de preparare a elaborărilor s-a urmărit pe o perioadă de 18 luni, în intervalul: 1 ianuarie 2006 – 30 iunie 2007, pe un eșantion de 10 farmacii comunitare. Rezultatele obținute au arătat că există diferențe foarte mari între farmacii, în privința frecvenței preparării, a numărului și tipului de elaborări realizate. Farmacia situată pe primul loc a înregistrat, în 18 luni, un număr de 413 situații de elaborare, față de farmacia de pe ultimul loc care a avut doar 45 situații de elaborare. Numărul de tipuri de elaborări întâlnite, în farmaciile luate în studiu, a fost de 40. În privința diversității elaborărilor preparate, farmacia de pe primul loc a preparat 28 de tipuri de elaborări, în timp ce farmacia de pe ultimul loc a realizat doar 7 tipuri de elaborări. Toate farmaciile cercetate au preparat: apă oxigenată, pasta Petrini și soluție de rivanol 1%. Alte elaborări preparate în majoritatea farmaciilor au fost: glicerină boraxată, unguent ihtiolat, alcool diluat, baza III, mixtură mentolată, tinctură de iod și tinctură Sabouraud.

**Keywords:** preparations (formulations), community pharmacies, (pharmacy) compounding

### **Introduction**

Before 1989 the activity of compounding represented one of the important activities in pharmacies. After the Romanian Revolution of 1989, together with the numerous changes in the pharmaceutical field, with the spectacular diversification and development of the industrial pharmaceutical forms, a constant decrease of the amount of preparations in pharmacies has been noticed.

The aim of this research has been establishing the actual preparations in the community pharmacies of Cluj-Napoca and pointing out the most frequent preparations.

### **Materials and methods**

The materials under study have been the books of preparations from 10 community pharmacies of Cluj-Napoca. The research has been conducted for 18 months between 1 January 2006 – 30 June 2007.

In order to make a representative selection of all the pharmacies in Cluj-Napoca there has been used the method of sampling based on some statistics algorithms of random stratified sampling taking into account homogeneity [1, 2, 3, 4, 8, 9]. Therefore, the following sampling criteria have been taken into account: the localization in space of the pharmacies and the density of pharmacies in different regions of the city.

There have been selected 10 community pharmacies representing 10% of the total number of the pharmacies in Cluj-Napoca, at the time of the research.

With respect to the criterion of localization in space of the pharmacies, the sample of pharmacies has been selected so as to include pharmacies from all regions of the city, both from the centre and from all neighbourhoods.

From all the regions of Cluj-Napoca there have been selected a number of pharmacies proportional to the total number of the existing pharmacies in the given region. In the regions with more pharmacies, the number of the selected pharmacies was higher, while in the regions with fewer pharmacies, the number of the selected pharmacies was lower.

For every pharmacy under observation there have been registered the date, the number of the compounding act, the preparation type [5-7].

The registered data have been gathered in synthesis tables in which for each preparation the number of compounding acts has been calculated.

Then the classification of the preparations in the pharmacies under study have been made by arranging the total number of compounding acts during the 18 months in decreasing order.

### Results and discussion

The obtained results concerning the 10 pharmacies under study (noted F1, F2, ..., F10) in the given period of time have been gathered in table I.

**Table I**  
The preparations and the total amount of  
compounding acts between 01.01.2006 – 30.06.2007

| Nr. crt. | Preparations                             | F1 | F2 | F3 | F4 | F5 | F6 | F7 | F8 | F9 | F10 | *   |
|----------|------------------------------------------|----|----|----|----|----|----|----|----|----|-----|-----|
| 1        | Boricated Alcohol 4%                     | 5  | -  | -  | -  | 3  | 19 | 3  | -  | -  | -   | 30  |
| 2        | Camphorated Alcohol 10%                  | 3  | -  | -  | -  | -  | 2  | 1  | -  | -  | 1   | 7   |
| 3        | Diluted Alcohol                          | 8  | 26 | 24 | -  | -  | 15 | 4  | 4  | 7  | 2   | 90  |
| 4        | Mentholated Alcohol 1%                   | 10 | -  | 13 | -  | 3  | 7  | 7  | -  | -  | 2   | 42  |
| 5        | Salicylic Alcohol 1%                     | -  | -  | -  | -  | -  | 4  | -  | -  | -  | -   | 4   |
| 6        | Oxygenated Water 3%                      | 60 | 26 | 36 | 8  | 21 | 70 | 4  | 5  | 15 | 18  | 263 |
| 7        | Base III                                 | 13 | 26 | -  | -  | 4  | 6  | 4  | 3  | 4  | 2   | 62  |
| 8        | Face Cleansing Cream                     | 20 | -  | -  | 6  | -  | -  | 9  | 2  | 7  | 8   | 52  |
| 9        | Face Cream with Vitamins                 | -  | -  | -  | -  | -  | -  | 14 | -  | -  | -   | 14  |
| 10       | Dr. Butnariu Cream                       | -  | -  | -  | -  | -  | -  | 23 | -  | -  | -   | 23  |
| 11       | Eritromicin + Physiological Serum        | -  | -  | -  | -  | -  | 18 | -  | -  | -  | -   | 18  |
| 12       | Borax Glycerine 10%                      | 22 | 4  | 10 | -  | 8  | 31 | 5  | 5  | 6  | 5   | 96  |
| 13       | Borax Glycerine + Anesthesine            | -  | -  | -  | -  | 2  | 37 | -  | -  | -  | -   | 39  |
| 14       | Borax Glycerine + Nystatin               | -  | -  | -  | -  | 2  | -  | -  | -  | -  | 2   | 4   |
| 15       | Borax Glycerine + Anesthesine + Nystatin | -  | -  | -  | -  | 5  | -  | -  | -  | -  | -   | 5   |
| 16       | Glycerinated Gelatin (Base)              | -  | -  | -  | -  | -  | -  | 1  | -  | -  | -   | 1   |
| 17       | Menthol Mixture                          | 27 | -  | -  | 6  | 5  | 12 | 11 | 4  | 10 | 1   | 76  |
| 18       | Petrini Paste                            | 43 | 10 | 17 | 9  | 8  | 10 | 20 | 10 | 41 | 10  | 178 |
| 19       | Dr. Butnariu Nose Drops                  | -  | -  | -  | -  | -  | -  | 17 | -  | -  | -   | 17  |

Table I (continued)

| Nr. crt. | Preparations                               | F1 | F2 | F3 | F4 | F5 | F6 | F7 | F8 | F9 | F10 | *   |
|----------|--------------------------------------------|----|----|----|----|----|----|----|----|----|-----|-----|
| 20       | Nose Drops with Biseptol® (Co-trimoxazole) | -  | -  | -  | -  | -  | -  | 4  | -  | -  | -   | 4   |
| 21       | Ephedrine Serum 1%                         | -  | -  | 7  | -  | -  | -  | -  | -  | 5  | -   | 12  |
| 22       | Physiological Serum                        | 33 | -  | -  | -  | -  | 21 | -  | -  | -  | -   | 54  |
| 23       | Dr. Lădaru Syrup                           | -  | -  | -  | -  | -  | 18 | -  | -  | -  | -   | 18  |
| 24       | Dr. Salvan Syrup                           | -  | -  | -  | -  | -  | 42 | -  | -  | -  | -   | 42  |
| 25       | Antiperspirant Solution                    | -  | -  | -  | -  | -  | -  | 9  | -  | 1  | -   | 10  |
| 26       | Boric Acid Solution 3%                     | -  | -  | -  | -  | -  | 19 | 3  | -  | -  | -   | 22  |
| 27       | Methylene Blue Solution 1%                 | 3  | -  | -  | -  | 3  | 4  | 6  | -  | 3  | 1   | 20  |
| 28       | Fuxine Solution 1%                         | -  | -  | -  | -  | 2  | -  | 4  | -  | -  | -   | 6   |
| 29       | Piactanine Solution 1% (Gentian Violet)    | 3  | -  | -  | -  | 2  | 3  | -  | -  | 4  | 2   | 14  |
| 30       | Rivanol Solution 1%                        | 72 | 26 | 31 | 8  | 21 | 52 | 8  | 10 | 16 | 12  | 256 |
| 31       | Lugol's Solution 5%                        | -  | -  | -  | -  | -  | 3  | -  | -  | -  | -   | 3   |
| 32       | Sulfate Shampoo                            | -  | -  | -  | -  | -  | -  | -  | 4  | -  | -   | 4   |
| 33       | Tincture of Iodine 2%                      | 9  | -  | 13 | 2  | -  | 4  | 4  | -  | 3  | 3   | 38  |
| 34       | Sabouraud's Tincture                       | 6  | -  | -  | 2  | 3  | -  | 3  | 1  | 1  | 2   | 18  |
| 35       | Antihemorrhoidal Ointment                  | -  | -  | -  | -  | -  | -  | 7  | -  | -  | -   | 7   |
| 36       | Urea Ointment 10%                          | -  | -  | -  | -  | -  | -  | 1  | -  | -  | -   | 1   |
| 37       | Ichtiol Ointment 10%                       | 11 | -  | 13 | 4  | 3  | 8  | 3  | 2  | 7  | 4   | 55  |
| 38       | Callosity Cream                            | 32 | -  | -  | -  | -  | 8  | 3  | -  | -  | -   | 43  |
| 39       | Salicylic Ointment 5%                      | -  | -  | -  | -  | -  | -  | 4  | 3  | -  | -   | 7   |
| 40       | Simple Ointment                            | 4  | 11 | -  | -  | -  | -  | 5  | -  | -  | 1   | 21  |

\*TOTAL

Table I includes the frequency of preparations in every pharmacy under study during the 18 months. It can be noticed that 40 types of preparations have been carried out in total.

The widest range of preparations have been made in the following pharmacies: F7 (28 types of preparations) and F6 (23 types of preparations). The other pharmacies have made fewer types of preparations: 19 (pharmacy F1), 17 (pharmacy F10), 16 (pharmacy F5), 15 (pharmacy F9), 12 (pharmacy F8), 9 (pharmacy F3), 8 (pharmacy F4) and 7 (pharmacy F2).

The preparations made in all the 10 pharmacies under study have been the following: oxygenated water, Petrini paste and rivanol solution 1%. With respect to frequency the next places are taken by borax glycerine 10% and ichtiol ointment 10% (9 pharmacies), diluted alcohol, base III and menthol mixture (8 pharmacies), tincture of iodine 2% and Sabouraud's tincture (7 pharmacies). The other preparations have been made occasionally: in 6 pharmacies – mentholated alcohol 1%, face cleansing cream, Methylene Blue solution 1%, in 5 pharmacies – pioctanine solution 1% (Gentian Violet), in 4 pharmacies – boricated alcohol 4%, camphorated alcohol 10%, simple ointment, in 3 pharmacies – callosity cream, in 2 pharmacies – borax glycerine with anesthazine, borax glycerine with nystatin, ephedrine serum 1%, physiological serum, antiperspirant solution, boric acid solution 3%, fuxine solution 1% and salicylic ointment 1%. The next preparations have been made in one pharmacy only: salicylic alcohol 1% (salicylic acid in alcohol), face cream with vitamins, Dr. Butnariu cream, eritromycin with physiological serum, borax glycerine with anesthazine and nystatin, glycerinated gelatin base, Dr. Butnariu drops, nose drops with Biseptol (Co-trimoxazole), Dr. Lădaru syrup, Dr. Salvan syrup, Lugol's solution 5%, sulfate shampoo, antihemorrhoid ointment and urea ointment 10%.

There can be noticed the fact that besides the known preparations some pharmacies also prepare some different formulas which are frequently prescribed by physicians having their medical office next to these pharmacies (e.g. Dr. Butnariu cream, Dr. Butnariu nose drops, Dr. Lădaru syrup, Dr. Salvan syrup).

**Table II**

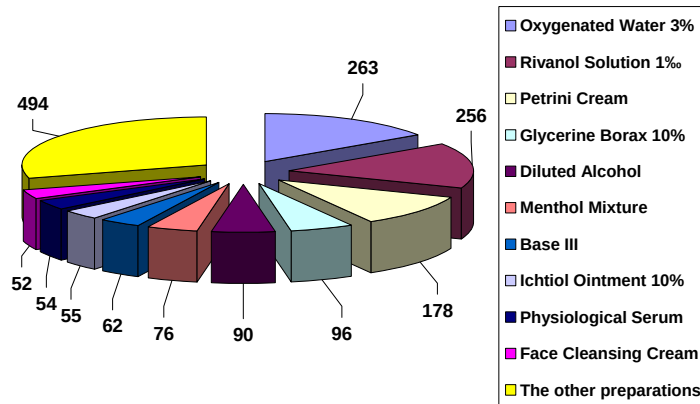
The order of the pharmacies taking account the total number of compounding acts

| Nr. crt.                                     | 1    | 2    | 3    | 4   | 5   | 6   | 7   | 8   | 9   | 10  |
|----------------------------------------------|------|------|------|-----|-----|-----|-----|-----|-----|-----|
| Pharmacies                                   | F6   | F1   | F7   | F3  | F9  | F2  | F5  | F10 | F8  | F4  |
| Total number of compounding acts / 18 months | 413  | 384  | 187  | 164 | 130 | 129 | 95  | 76  | 53  | 45  |
| Average number of compounding acts / 1 month | 22.9 | 21.3 | 10.3 | 9.1 | 7.2 | 7.1 | 5.2 | 4.2 | 2.9 | 2.5 |

In table II the classification of the studied pharmacies is presented by arranging in decreasing order the total number of compounding acts of every pharmacy under study during 18 months, as well as the average number of compounding acts per month. It can be noticed that the following pharmacies are situated on the first places: F6 (413 preparations, with an average number of 22.9 preparations per month) and F1 (384 preparations, with an average number of 21.3 preparations per month), and on the last places there are the following pharmacies: F8 (53 preparations, with an average number of 2.9 preparations per month) and F4 (45 preparations, with an average number of 2.5 preparations per month). The first placed pharmacy has made preparations approximately 10 times more frequently than the last placed pharmacy.

It can be noticed that with respect to the frequency of preparations there are differences among the observed pharmacies. Although some of the pharmacies have made formulations less frequently and due to the fact that pharmacies in Romania have known a significant decrease of the compounding acts compared to the period before 1989, it is still good that in all the pharmacies under study preparations are performed. Nevertheless there are concerns of the regulatory authorities in Europe and elsewhere about the lack of standardization of such a practice, as well as the lack of adequate demonstration of efficacy and safety.

Then there has been evaluated which preparations have had the largest number of compounding acts. The most frequent preparations in the 10 pharmacies under study are presented in figure 1.



**Figure 1**

The most frequent formulations in the pharmacies of Cluj-Napoca and the total number of compounding acts

Figure 1 indicates that the most frequent preparations have been: the oxygenated water (263 preparation situations), the rivanol solution 1% (256 preparation situations), the Petrini paste (178 compounding acts), the borax glycerine 10% (96 compounding acts), the diluted alcohol (90 compounding acts) and the menthol mixture (76 compounding acts).

The following have been prepared most rarely: Lugol's solution (3 compounding acts), glycerinated gelatin base and urea ointment (1 compounding act).

### Conclusions

The results of the research have indicated important differences concerning the frequency of preparations, the amount and type of preparations made in the pharmacies of Cluj-Napoca.

Out of the 40 types of preparations in the 10 pharmacies under study the widest range of preparations has been found in the following pharmacies: F7 (28 types of preparations) and F6 (23 types of preparations); the opposite is represented by the following pharmacies: F4 (8 types of preparations) and F2 (7 types of preparations).

The preparations made in all 10 pharmacies under study have been: the oxygenated water, the Petrini paste and the rivanol solution 1%. Also the borax glycerine 10% and ichtiol ointment 10% (in 9 pharmacies), the diluted alcohol, base III and menthol mixture (in 8 pharmacies), the tincture of iodine 2% and Sabouraud's tincture (in 7 pharmacies) are prepared rather frequently. The following have been prepared most rarely: Lugol's solution, glycerinated gelatin base and urea ointment.

With respect to the total number of compounding acts during 18 months, the following pharmacies have made preparations most frequently: F6 (413 compounding acts, with an average number of 22.9 compounding acts per month) and F1 (384 compounding acts, with an average number of 21.3 compounding acts per month), while pharmacy F4 has made preparations the least frequently (45 compounding acts, with an average number of 2.5 compounding acts per month). The pharmacy on the first place has made preparations approximately 10 times more frequently than the last placed pharmacy.

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