
GENERAL

**INDIVIDUAL MEDICATION MANAGEMENT SYSTEM (IMMS)
IMPLEMENTATION IN PHARMACISTS' OPINION****MAGDALENA WASZYK-NOWACZYK^{1*}, SEBASTIAN LAWICKI², MICHAŁ MICHALAK³
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Abstract: Many countries of the world including Poland, are taking actions for improving the role of the pharmacist as a health care professional. One of those is implementation of pharmaceutical care (PC), as a documented specialist medical service, which also includes pharmacist interventions, such as preparing Individual Medication Management System (IMMS), to enhance patient's adherence. Because of the chance to monitor the dosage and to detect and prevent drug problems occurrence, IMMS is thought to be an opportunity for individualized, effective and safe patient's pharmacotherapy. The aim of the study was to define pharmacists' attitudes toward IMMS. The study included also the evaluation of pharmacist-physician cooperation to determine whether IMMS can improve partnership among health care professionals for proper patient's care. The survey was conducted in Poznań, between June 2011 and March 2012. An anonymous questionnaire was delivered personally to pharmacists. Each questionnaire was provided with a short information brochure attached and presentation of demos how to use IMMS. The survey covered 129 pharmacists (76.7% women and 23.3% men) where 48.8% had up to 5 years length of service as a pharmacist, 24.8% – 6–10 years, 14.9% – 11–20 years and 11.5% – 21 and more years. Most of the participants did not have specialization (80.6%) and only 5.4% had Ph.D. degree. Survey confirmed that 64.8% of pharmacists ($p < 0.0001$), mainly with the shortest length of service ($p = 0.02268$) and without specialty ($p = 0.00244$) didn't cooperate with physicians, but 68.8% of respondents emphasized that the range of cooperation could increase by IMMS application ($p < 0.00001$). About 50.0% of respondents' considered that patients would be interested in IMMS usage ($p = 0.00079$) and in 71.9% opinions, it would attach the patient to specific community pharmacy ($p < 0.00001$). This statement was confirmed by respondents with the shortest length of services ($p = 0.00659$). Proposed dosing system also improved patient's care serving by family or carers in pharmacists' opinion ($p < 0.00001$). A majority of pharmacists (85.3%) indicated also that IMMS would have a positive influence on PC implementation in Poland ($p < 0.00001$) and 69.0% of them confirmed that this service should be refunded by the National Health Fund ($p < 0.00001$). According to the scale of non-compliance, implementation of IMMS as a part of PC can be a chance both for patients and their physicians to increase the safety and effectiveness of therapy and for pharmacists, who are intended to highlight their role as a part of health care system.

Keywords: Individual Medication Management System, pharmaceutical care, pharmacist, physician

In recent years there has been many changes in pharmacist profession, which had significant influence on community pharmacy functioning in Poland. Development of pharmaceutical industry brought about displacing compounded drugs in community pharmacies so that pharmacists have been focused on the services for patients. (1, 2). According to differ-

ent countries, they should be directed at patients' education, prevention and health care promotion (3). So that pharmaceutical care (PC) as a new idea of pharmacists' profession should assure the safest and the most effective therapy to improve a patient's quality of life. It should progress also in the cooperation with physicians (4–7).

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Essential part of PC is proposed Individual Medication Management System (IMMS; Fig. 1.) for solid drugs with special division into compartments dedicated to specific time of the day on particular days of the week. This makes it easier to check whether each dose has been taken. In comparison with classic dispensers in Poland, the basic issue is that IMMS is prepared by qualified pharmaceutical staff like master of pharmacy or technician supervised by master of pharmacy. It decreases the risk of errors, which can occur without professional intervention (8).

Pharmacist responsible for preparing IMMS is obligated to check dosing scheme propriety and relevant doses. It should be pointed out when drugs interactions occur. It has a special meaning when the patients suffer from chronic diseases with complicated dosing schemes ordered by different physicians. In this area, a great opportunity of drug problems can occur and failure to doctor's recommendations (9–11). IMMS enables the same drug under different trade names elimination, gives possibility of drug doses verification and indicates adverse drug reactions. Patient using IMMS should be included in PC program, which is implementing in Poland.

IMMS preparation should take place in specific community pharmacy chosen by the patient, so that the pharmacist would have an access to patient's medical documentation and history. What is more, IMMS should be implemented as a medical service with National Health Fund refund, which is a Polish Pharmaceutical Chamber suggestion (12, 13). It could be ready to use when leading physician refers patient to pharmacist or when patient will pay for this service by private order. This process needs an appropriate documentation refilled by pharmacists and physicians (14).

The aim of the study was to determine pharmacists' attitudes toward IMMS, which could be another possibility of pharmacist–physician cooperation to get a proper patient's pharmacotherapy. Thus, the study defined whether IMMS could improve partnership among health care professionals for proper patient's care. Additional goal was to define pharmacists' opinion according to patients' interest in this service, funding source and IMMS impact on PC implementation in Poland. The data assumed analysis for gender, specialty, scientific/professional degree and length of service as a pharmacist.

MATERIAL AND METHOD

The survey was conducted in Poznań, between June 2011 and March 2012. An anonymous questionnaire was delivered personally to pharmacists working in community pharmacies. The survey covered 129 pharmacists (76.7% women and 23.3% men). The most numerous group consisted of pharmacists aged up to 30 years (46.3%) with up to five years length of service as a pharmacist (48.8%). The other age groups were: 31 – 40 years – 28.1%, 41–50 years – 14.9% and 51 years and more – 10.7%. This data confirmed also the length of service as a pharmacist, which were: 6–10 years – 24.8%, 11–20 years – 14.9%, 21 and more – 11.5%. Similar results brought about that only the length of service was analyzed in the research. Most of the participants did not have specialty (80.6%). Only 17.1% had community pharmacy and 2.3% clinical pharmacy specialty, so groups were joined together and named as pharmacists with specialization. In the study, there were only 5.4% pharmacist with Ph.D.

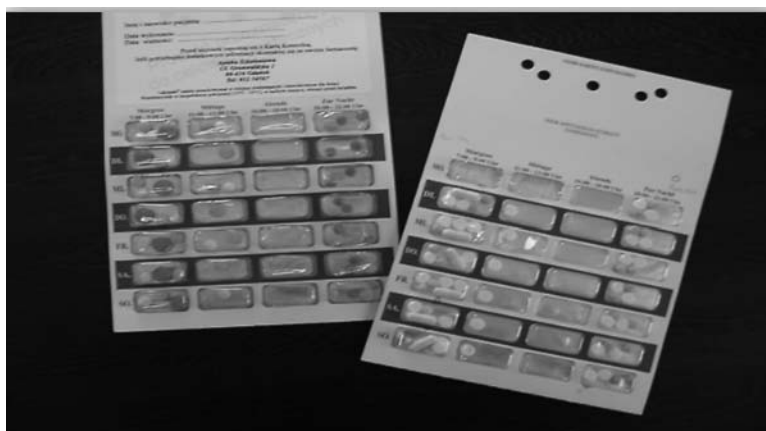


Figure 1. Individual Medication Management System (author's photo)

degree. The rest had master of pharmacy degree (94.6%).

The study included the evaluation of pharmacist–physician cooperation to determine whether IMMS could improve partnership among health care professionals for proper patient’s care. The participants answered also the questions about their view of IMMS effectiveness, its funding sources and possible impact on PC implementation. Each questionnaire was provided with a short information brochure attached and presentation of demos how to use IMMS. The study received Ethical Board revision and acceptance.

The results were statistically analyzed with the use of Statistica 8.0 application (StatSoft®). In order to analyze relationships between the traits, taking into account sample size and frequency of analyzed

categories of the examined traits, chi-square test of independence (χ^2) was used in case of a large sample and higher frequency of categories, and Fisher-Freeman-Halton test for low expected frequencies. For all the statistical analyses, a significance level of 0.05 was used to assess differences between groups. The effectiveness of the research was tested on the basis of questionnaire return, which was 72.9%. It leads to conclusion that research technique was relatively effective.

RESULTS

Integral element of pharmacist’s profession in PC is permanent contact with physician to consult patients’ pharmacotherapy. The study indicated that 64.8% of respondents did not cooperate with the

Table 1. Pharmacists’ opinion concerning cooperation with physicians and pharmacists’ specialty and length of service.

Pharmacists’ details:	Number of cooperative physicians:					p-value
	0 n (%)	1 n (%)	2 n (%)	3 n (%)	≥4 n (%)	
Specialty						
Yes	9 (37.5)	4 (16.7)	2 (8.3)	3 (12.5)	6 (25.0)	0.00244*
No	74 (71.1)	8 (7.7)	10 (9.6)	1 (1.0)	11 (10.6)	
Total	83 (64.8)	12 (9.4)	12 (9.4)	4 (3.1)	17 (13.3)	
Length of service as a pharmacist						
Under 5 years	44 (74.6)	4 (6.8)	4 (6.8)	0 (0.0)	7 (11.8)	0.02268*
6–10 years	20 (66.7)	4 (13.3)	2 (6.7)	0 (0.0)	4 (13.3)	
11–20 years	10 (55.6)	1 (5.6)	2 (11.1)	4 (22.1)	1 (5.6)	
Over 20 years	6 (42.8)	2 (14.3)	2 (14.3)	0 (0.0)	4 (28.6)	
Total	80 (66.1)	11 (9.1)	10 (8.3)	4 (3.3)	16 (13.2)	

*p < 0.05. Missing values because of the lack in pharmacists’ answers compared with analyzed group.

Table 2. Pharmacists’ opinion concerning patients’ attachment to specific community pharmacy after IMMS implementation and length of service as a pharmacist.

Length of service as a pharmacist	Yes n (%)	No n (%)	No opinion n (%)	p-value
Under 5 years	48 (81.4)	5 (8.4)	6 (10.2)	0.00659*
6–10 years	24 (80.0)	4 (13.3)	2 (6.7)	
11–20 years	13 (72.2)	2 (11.1)	3 (16.7)	
Over 20 years	5 (35.7)	2 (14.3)	7 (50.0)	
Total	90 (74.4)	13 (10.7)	18 (14.9)	

*p < 0.05. Missing values because of the lack in pharmacists’ answers compared with analyzed group.

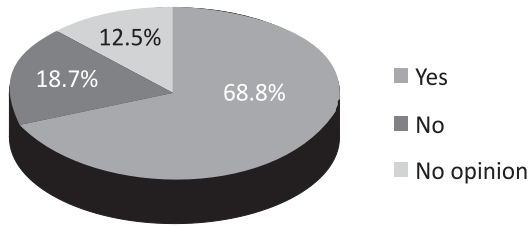


Figure 2. Pharmacists' opinion concerning partnership with physicians' expanded by IMMS application; n = 128
Missing values because of the lack in pharmacists' answers compared with analyzed group

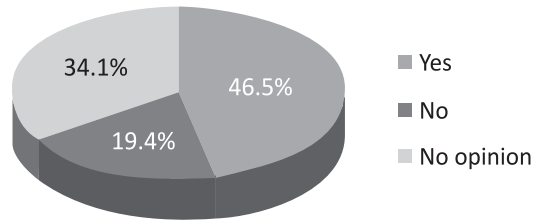


Figure 3. Pharmacists' opinion concerning patients' IMMS interest; n = 129

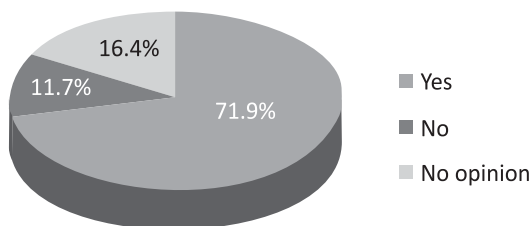


Figure 4. Pharmacists' opinion concerning patients' attachment to specific community pharmacy after IMMS implementation; n = 128
Missing values because of the lack in pharmacists' answers compared with analyzed group

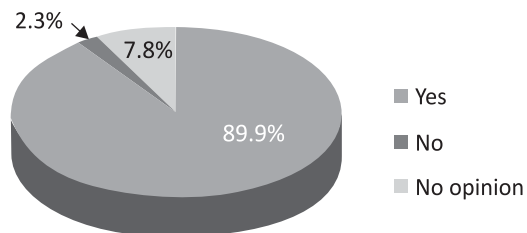


Figure 5. Pharmacists' opinion concerning simplification of patients' care serving by family or carers after IMMS implementation; n = 129

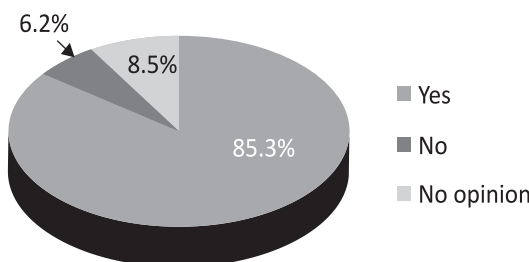


Figure 6. Pharmacists' opinion concerning positive influence of IMMS implementation on PC development; n = 129

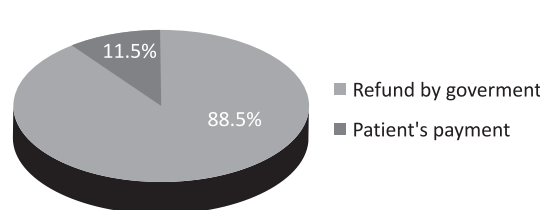


Figure 7. Pharmacists' opinion concerning the source of IMMS funding; n = 122
Missing values because of the lack in pharmacists' answers compared with analyzed group

physicians. The rest of the pharmacists collaborated with at least 1 doctor where 13.3% contacted with at least 4 of them ($p < 0.00001$; Table 1). No cooperation declared mainly respondents with the shortest length of services. It can be seen also the tendency from the data in Table 1 that the length of services determined better collaboration with doctors ($p = 0.02268$), especially when pharmacist had got a specialty ($p = 0.00244$). What's more, 68.8% questioned considered proper partnership and better effectiveness and safety of pharmacotherapy by

IMMS application ($p < 0.00001$). The data are shown in Figure 2.

Forty six and a half percent of pharmacists indicated that patients' would be interested in IMMS, but 34.1% of them had no opinion according to this statement ($p = 0.00079$; Fig. 3.). Many (71.9%) believed that this service would attached the patient to chosen community pharmacy ($p < 0.00001$; Fig. 4.). As shown in Table 2, this opinion belonged mainly to respondents with the shortest length of services ($p = 0.00659$). IMMS could also

improve care of the sick serving by the family or carers ($p < 0.00001$; Fig. 5.).

A majority of questioned (85.3%) considered that IMMS could have a positive impact on PC implementation in Poland ($p < 0.00001$; Fig. 6.). This service should be refunded by the National Health Fund in 88.5% pharmacists' opinion, in comparison with private patients' payment ($p < 0.00001$; Fig. 7.).

Additional gender, specialty scientific/professional degree analysis did not achieve the level of statistical significance.

DISCUSSION AND CONCLUSION

The results of the study proved that nearly 35.0% of pharmacists cooperated with physicians. These were mainly respondents with a huge professional experience, also with specialty. Similar findings were in the study from 2005, where only 25.9% of pharmacists consulted the patients' pharmacotherapy with doctors (15). This confirmed that physician and pharmacist partnership was not sufficient. The fact is that it brings a lot of outcomes especially for the patients, so it should be improved to get a better pharmacotherapy control (16–18). In this study, poor cooperation indicated mainly pharmacists with the shortest length of service. There were assumed also a tendency where the length of services determine better collaboration with doctors, especially when pharmacist had got a specialty. Probably, it is because of the huge professional experience, which gives the possibility to connect in a better way. According to the study from 2012, half of the doctors collaborated with pharmacists (14). In Ontario, physicians contacted with pharmacists five times a week to establish patients' pharmacotherapy and 28% of them – experienced ones, referred their patients directly to community pharmacies to get a drug consultation (19). The researches beyond the border of Poland confirmed also that coordinated activity of this two professional groups would bring a lot of benefits for the patient (16–18, 20–22).

This survey indicated that 68.8% pharmacists highlight necessity of enlarging the range of cooperation with physician to get effective and save pharmacotherapy by IMMS application. Iskierski and Zimmermann demonstrated that in pharmacists' opinion the patients' pharmacotherapy could be obtained by collaboration with doctors in the drug consultation but the problem was in a lack of organized forms of such cooperation (15). So IMMS could be the proposition to improve pharmacist-physician partnership.

The current study found out that pharmacists considered IMMS as a tool, which would have an influence on PC implementation. This dosing system, in definition, should indicate interactions, wrong doses and patient's nonadherence what would assure a great pharmacotherapy supervision. Szalotka in 2010 demonstrated that in 78.0% pharmacists' opinion PC should contribute to more secure drug taking. It was indicated also that the main barrier limiting PC implementation in Poland was poor communication between this two groups (23). Thus, IMMS could help in better partnership, what is also confirmed in conducted study. It was also interesting to note that in this research, respondents mainly with short experience pointed out that IMMS application would attached patients to proper community pharmacy and simplify their care serving by family or careers. Similar results were confirmed by the patients, who in 83.0% cases accepted IMMS as a significant tool to improve medical care (14). This view is supported by many studies, which reported many IMMS benefits (24–26).

Another important finding was that 46.5% of pharmacists recognized that patients would apply IMMS. This results are consistent with those of other study from 2010 but conducted on community pharmacy patients and carers – respectively, 47.2% and 56.0% (14). It generates a great possibility to make use of pharmacists as drugs experts within PC process and IMMS service. It would give a chance to achieve proper partnership with physicians and improve medical care.

Essential element of the study was financial analysis according to the source of IMMS payment. This system should be refunded by the National Health Fund not from private patients' income in pharmacists' opinion. In the study from 2012, it was highlighted that 55.4% of patients didn't accept paying for IMMS. Only 30.0% of carers presented willingness to pay for the system (14). In many countries where dosing systems are functioning, the patients are responsible for paying. In Great Britain, a customer is paying for the blister and additional charge depends on pharmacist's will (27). In Australia, the patient gives weekly rates for IMMS supplying (28).

Nowadays, the community pharmacy is exposed to many changes, especially related with application of new services such as IMMS in PC program. It gives a chance, both for patients and their physicians, to increase the safety and effectiveness of therapy and for pharmacists, who are intended to highlight their role as a part of health care system. Implementation of PC as a documented

specialist medical service, including the possibility of preparing IMMS, is expected by patients and caregivers as well as the physicians, who in collaboration with pharmacists see the opportunity of individualized and controlled patient's pharmacotherapy.

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