

Assessment of patients' awareness on drugs use and adherence to drug therapy as an element of Medication Review service

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Abstract

The administration of an excessive amount of or unnecessary drugs is a prerequisite for numerous drug-related problems, non-compliance, non-adherence to medicinal therapy, exacerbation and poor control of chronic diseases, and failure in achieving the treatment goals. The aim of this study was to assess patients' awareness on drug use (administration, adherence to drug therapy) and to identify the possible drug-related problems with patients, using 5 or more medicines on Bulgarian territory. The data were collected implementing a structured study tool – a questionnaire for assessment of patients' therapy using 5 or more drugs prescribed by a physician, including OTC and/or food supplements. The study provided an identification of factors affecting skipping of doses, modification of regime and analyzed the relationships and interdependencies between number of diagnoses and adverse drug effects rate; number of administered drugs and reported problems and unawareness of the medicinal product indications and health state.

The results showed that it was necessary to introduce the Medication Review (MR) service in Bulgarian pharmaceutical practice. That will provide possibilities for development of pharmacists' role in dispensing medical products, it will help in reducing drug-related problems and increasing the effectiveness of the treatment and adherence to medical therapy.

Keywords

assessment, awareness, patients, drug use, disease, adherence, therapy

Introduction

During the last decades chronic diseases have been prevailing over infectious diseases and their incidence tended to constant increasing (Van Wilder et al. 2022). As chronically ill patients usually are at greater polymorbidity risk, administration of numerous drugs is often observed, especially among elderly population (Hajjar et al. 2007; Bulajeva et al. 2014; Masnoon et al. 2017). During the last twenty years the polypharmacy issue or excessive drug intake has been constantly aggravating. Data from global statistics have shown that more than 4 of 10 adults used five or more medicines and almost 20% were administered 10 or more medicines (Dzhambazov et al. 2022). Polypharmacy describes the simultaneous use of numerous drugs, including non-prescribed drugs (OTC), food supplements and herb-based products (Hovstadius and Petersson 2012). Individuals aged 65+ are inclined to more drugs than any other age group as they can have several diseases or other health issues at the same time (National Institute of Aging 2021).

The excessive use or intake of unnecessary drugs is a prerequisite for numerous drug-related issues, such as adverse drug effects (ADR), drug interactions and interactions between diseases and drugs, when a drug prescribed for treatment of a given state deteriorates another one or triggers a new one (National Institute of Aging 2021). This fact itself causes bad compliance, non-adherence to drug therapy, exacerbation and poor control of chronic diseases, and failure to achieve the therapeutic goals (Tuula et al. 2021).

Polypharmacy can be distinguished as necessary and inappropriate. „Appropriate polypharmacy” is the case when an individual with numerous diseases is prescribed a number of medicines in an evidence-based way, that is, the combination of the prescribed drugs aims to provide better life quality, improve life expectancy and minimize drug toxicity (Duerden et al. 2013).

Inappropriate polypharmacy is observed when the patient is administered drugs without sufficient clinical indications, when inadequate medicines are prescribed or the adequate drug is used over an inadequate period of time (Guaraldo et al. 2011). In this case the patients do not take their medicines appropriately, the prescribed drugs do not achieve the therapeutic goals and there is a higher risk of occurrence of adverse drug effects (Tuula et al. 2021).

In order to support appropriate polypharmacy and guarantee drugs safety, there are globally developed numerous pharmaceutical services, such as medication therapy review. Drugs review procedures are distinguished by their access to clinical data, patients' involvement and aim of drugs review. Australia, USA and UK were the first countries that included drug review services in the primary outpatient care practice (Bulajeva et al. 2014).

By 2017 19 of 34 European countries offered Pharmacist-led Medication Review (MR) and it was recognized as one of the most frequently provided current cognitive services in Europe (Tuula et al. 2021).

As a structured assessment of patient's medications, the pharmacist-led medication review aims to discover drug-related problems and recommend interventions for optimization of drug use and improvement of health results (Tuula et al. 2021).

The medication review service is performed periodically or at intervention necessity, focused on adherence or on an issue established at drug dispensing. It covers improvement of patients' awareness, their adherence to therapy and reducing the problems at drug intake (Kaufman 2016; Tuula et al. 2021).

The Pharmaceutical Care Network in Europe (PCNE) offers the following classification of three types of medications review:

- ✓ PCNE type 1: Simple MR – based on the available medication history in the pharmacy. It reveals drug interactions, unusual dosage and some issues with drug adherence.
- ✓ PCNE type 2A: Intermediate MR – based on the available medicines history and information for the patient and it can be performed when the patient can be searched for information. It reveals drug interactions, some adverse drug effects, unusual dosage, problems with adherence, interactions between drugs and foods, effectiveness issues and OTC issues.
- ✓ PCNE type 2B: Intermediate MR – based on the drug history and medical information, it can be performed if there is also information provided by the GP. It reveals drug interactions, some unusual dosages, problems with observing the regime, interactions with foods, effectiveness issues, indications without a medicine and medicines without indications.
- ✓ PCNE type 3: Advanced MT – based on drug history, patient's and clinical information. It reveals drug interactions, adverse drug effects, effectiveness issues, OTC problems, indications without a drug and drugs without indications, dosage issues (Griese-Mammen et al. 2018).

Those three types of drugs review according to PCNE suppose that the overall information for dispensing all medicines that the patient takes (has received)/receives (has taken) recently is available to pharmacists. Which form of intermediate MR is realizable depends on the legislation and structure of the pharmaceutical system in the country (https://www.pcne.org/upload/files/150_20160504_PCNE_MedRevtypes.pdf, available at 28.03.2023).

In Bulgaria currently there are traditional services such as dispensing medicinal products and professional consultations (Balkanski et al. 2020). Pharmacist-led MR services are not offered. Pharmacists, though they have competent knowledge of medicinal products are still an insufficiently used resource capable of improving prevention and care of patients with a number of chronic diseases (Stoimenova et al. 2011).

A pilot project in this direction “Following and assessment of drug-related problems (FADRP) at pharmacies serving the Bulgarian population” was developed and realized at 5 pharmacies in 5 regional Bulgarian towns using PCNE type 2A classification: Intermediate drugs review.

Aim: to assess patient’s awareness for drugs use (administration, adherence to medication therapy) and to identify the possible issues with elderly patients, taking 5 or more medicines prescribed by a physician, including OTC and/or food supplements.

Ethical assessment

The questionnaire and related documents (declaration for consent for access to a pharmacy and participants’ informed consent) were presented to an Ethical commission for scientific research at Medical University – Varna that approved the pilot study (Protocol № 88/28.11.2019). All respondents signed an informed consent statement before involving in the study.

Material and methods of the study

Study design

A structured research tool – questionnaire for assessment of the therapy of patients taking 5 and more drugs prescribed by a physician, including OTC and/or food supplements was implemented. The data were collected by the pharmacists in an interview with the patients that have signed the informed consent document, made at each of the three monthly meetings within three months period. Estonia’s good practice was used in the realization of the pilot project that has developed MR services, based on Pharmaceutical Care Network Europe (PCNE).

The pilot study included analysis and assessment of the data at two stages:

- Stage 1: Patient’s self-evaluation concerning knowledge of his/her disease and use of drugs for an existing disease; issues in use of medicinal products (MP) and pharmacist-identified drug-related issues.
- Stage 2: Patient’s feedback and satisfaction with the provided FADRP service.

This paper discusses the results from the data analysis obtained at stage 1, covering looking for relationships and interdependencies between: factors affecting skipping of doses; factors affecting regime modification; number of diagnoses and adverse drug reactions rate; number of taken drugs and reported issues and unawareness of the indications of the medicinal product and health state.

The pilot study was organized in the period September 2019–July 2022 with 120 patients at 5 regional town pharmacies in Bulgaria.

Criteria for participation: Patients taking 5 and more prescribed drugs, capable of signing informed consent documents and willing to participate in the study.

Exclusion criteria: Patients with exacerbated chronic diseases, dementia, hospitalized during the last 3 days, patients with communication barriers (disturbed speech, hearing and vision), patients unable to give consent.

Methods used in the research: historical, documentary, statistical and graphic methods.

The relationship between the variables was analyzed by χ^2 test, Mann-Whitney U test and correlation ratio.

The statistical processing of the data was performed by a statistical programme R version 4.2.2. for statistical analysis and proof of relationships and interdependencies.

The data collected by the present study were mainly nominal data – the evaluations for the majority of the questions followed the 5-point Likert scale – strongly disagree, disagree, neither agree, nor disagree, agree or strongly agree; for self-estimation – very poor, poor, normal, good, very good; participant’s sex – male/female; availability of issues – yes/no; the age was assessed as a rank for a certain range.

Results

The study involved 120 patients, 61 men (50.83%) and (49.16%) women. The greatest was the number of patients in the age group 71–80 years (43.30%), followed by those of age group 61–70 (28.30%) and 50–60 (16.7%). The smallest number was that of patients belonging to the 81–90 yrs. age group – 11.70%.

Considering the number of taken medicinal products, including food supplements and/or OTC, the patients taking 5 MP prevailed – 60.83% (n=73), 6 MP were taken by 20.83% (n=25), 7 and 8 MP were taken by an equal percentage rate of the respondents – 9.17% (n=11) (Fig. 1).

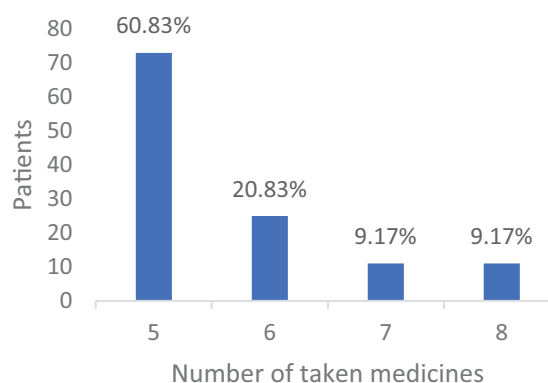


Figure 1. Number of taken medicinal products per patient.

Concerning the number of diagnoses the distribution of respondents was the following: one diagnosis – 2.5% (n = 3), two diagnoses were reported by 28.33% (n = 34),

three diagnoses – by 25.00% (n = 30), four diagnoses by 20.00% (n = 24), five diagnoses were found in 21.67% (n = 26). The lowest percentage rate was that of respondents with 6 or 7 diagnoses – 0.83% (n = 1) and 1.67% (n = 2), respectively as shown in Fig. 2. The respondents' diagnoses are chronic diseases in the field of cardiovascular, pulmonary, endocrine, gastroenterological and neurological diseases. They were combined as comorbidity with patients with 2 and 3 diagnoses predominating, followed by respondents with 4 and 5 diagnoses.

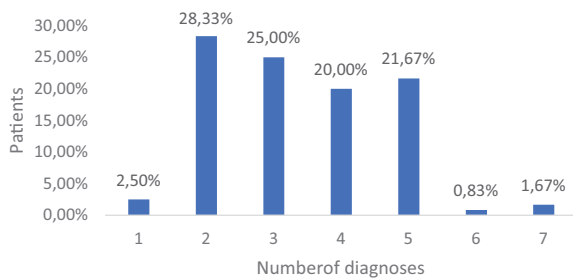


Figure 2. Number of respondents' diagnoses.

A little more than half of the respondents defined their health state as good – 55.5%, for 33.6% of them it was poor, 1.7% thought it was very poor, 8.4% declared a good health state and only 0.8% defined it as very good.

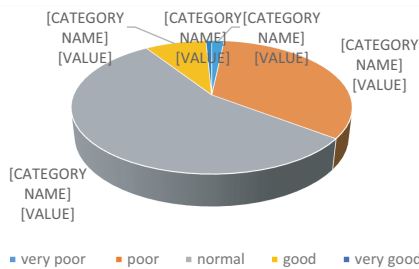


Figure 3. Respondents' health state self-evaluation.

Referring to the use of drugs for an existing disease, the interviewed individuals made their assessment of the indicated statements with the 5-point Likert scale (1 – „strongly disagree“; 5 – „strongly agree“).

Table 1 presents the results associated with the patient's self-assessment of the use of medicines for an existing disease. The highest total estimate (3.83 ± 0.9) was given by the respondents to the statement that they would feel very ill without medicines. The percentage rate of the statements of the majority of respondents (66.4%) that they understood their disease and would feel very ill

without medicines was equal. As for the medicines taken by the patients, 54.6% of them declared concern. The lowest mean estimate (2.56 ± 0.91) given to the statement “I do not understand how medicines improve my health” was embarrassing.

During the interview with the patient the pharmacists have identified the following more important issues in MP use: half (50%) of the respondents skipped doses; the therapeutic regime was modified by 41.67% of the patients; 38.33% of the respondents had adverse drug reactions and 36.13% of the patients did not know the indications of the medicine/medicines. The medicines were taken at an inappropriate time by 20.83% of the respondents.

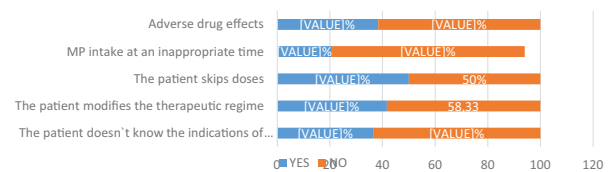


Figure 4. Issues in MP use revealed by the pharmacist.

The main issue identified by the pharmacists was associated with skipping of doses by the patients. In order to establish the characteristics of this factor, the authors studied the differences between patients skipping and non-skipping doses referring to age, sex, number of diagnoses and number of administered medicinal products. No statistically significant difference was found between age or sex, and skipping of doses. The relationship between the number of taken medicinal products and skipping of doses (p-value <0.001) and number of diagnoses and skipping of doses (p-value <0.001) was statistically significant. The results revealed that the patients who skipped doses had a greater number of both medicines and diagnoses.

The second problem identified by the pharmacists was related to modification of the therapeutic regime by the patients. One of the reasons for modification of the therapeutic regime was the intake of a greater number of medicines. The Mann-Whitney U test results (p-value 0.003) showed that patients who modified the regime used more medicines than those who adhered to the prescribed regime, and also that there was a relationship between the number of diagnoses and regime modification (p-value 0.001).

The Mann-Whitney U test results (p-value 0.001) showed that patients who took their drugs at an inappropriate time used more medicines than those who adhered to the prescribed time regime, and also that they had a greater number of diagnoses (p-value 0.001). Despite the

Table 1. Patients' self-evaluation referring to use of medicines for an existing disease.

Statement	Number of replies	1	2	3	4	5	mean ± SD
1 I understand my disease	119	2.5%	5.9%	26.9%	51.3%	13.4%	3.67 ± 0.87
2 I am often concerned about the use of the drugs I take	119	0.8%	3.4%	41.2%	41.2%	13.4%	2.63 ± 0.79
3 My health state depends on the medicines	119	0.8%	5.0%	27.7%	52.1%	14.3%	3.74 ± 0.80
4 Without medicines I would feel very ill	119	1.7%	4.2%	27.7%	42.0%	24.4%	3.83 ± 0.9
5 I do not understand how medicines improve my health	119	12.5%	34.5%	37%	16%	0.00%	2.56 ± 0.91

different combination of comorbidity, no statistical relationship was found between the different groups of diseases in the respondents and their behavior, changing the therapeutic regimen or missing medication, the correlation that was found was between patients with more diagnoses and taking more medications, with changes in the therapeutic drug course and irrational drug intake.

When investigating the relationships between the number of diagnoses and rate of adverse drug effects, a considerable statistically significant correlation was established ($r = 0.378$, p -value < 0.001), showing that the rate of adverse drug effects increased with the increase of the number of diagnoses.

The last identified issue at drugs intake, revealed by the pharmacists during the interview with the patients was associated with patients' lack of knowledge of the indications of the medicinal products. In addition, patients do not know the regulation and dispensing regime of medicinal products and do not distinguish prescription drugs from OTC drugs.

When investigating to what extent the knowledge of the indications of the medicinal products affected the health state extent, it was established that the null hypothesis of independence could not be rejected (p -value 0.792).

No statistically significant differences were found between skipping of doses, modification of the therapeutic regime and knowledge of medicines indications as well and whether they were OTC or prescription drugs.

Discussion

In the pilot study we implemented the Intermediate medications review type 2A according to PCNE classification, performed by pharmacists and based on medications history and patients' information. It presented the primary results from the preliminary implementation of the pharmacist-led MR Service in order to assess patients' understanding of their diseases, of medicines use, of observing the prescribed therapy and identified drug-related issues in elderly individuals, taking five or more medications prescribed by a physician, including OTC and/or food supplements.

The results from the study showed that the studied group was inclined not to adhere to the therapy and had poor knowledge of the medicinal products. Those behaviors tended to intensify with the age and polypharmacy and were confirmed by a study of Masnoon et al. 2017. Non-adherence and unawareness of the indications of the medicines created a risk of adverse drug effects occurrence, disease exacerbation, ineffectiveness of the therapy (Getova 2018; Tuula et al. 2021; Dzhambazov and Vutova 2022) and increase of the issues related to use of medicines (Hajjar et al. 2007; Bulajeva et al. 2014).

The main reasons for non-adherence in the studied group was the skipping of doses by 50% of the respondents, modification of the therapeutic regime by 46.7%, and taking the medicines at the wrong time by 20.83% of the patients, that was associated with the use of a greater

number of taken medicine and more complex designs for long-term application (Nashev 2015).

The results showed that patients, skipping doses and taking medicines at the wrong time were administered a greater number of medicines as well as had more diagnoses. The use of numerous drugs reduced the possibility of adhering to the medications (Ulfvarson et al. 2007).

The identification and clarification of the best limit value of the optimal number of taken medicines was important from the aspect of guidance for prescribing doctors and researchers investigating polypharmacy in elderly people as a tool to improve medication-related results (Gnjidic et al. 2012).

The reduction of the number of medicines administered to the patient could lead to a higher extent of adherence to the therapy. A smaller number of medicines often meant less skipped or doubled doses, thus increasing the positive health results. A study of Brummel et al. confirmed that MR caused improved therapy adherence (Brummel et al. 2016).

The data from the study showed that the regime modification was affected by the great number of taken medicines and also by the number of established diagnoses. The increased number of diagnoses caused increased possibility of regime modification. Such relationship was not discovered between patients' age and sex and regime modification. At unwarranted modification of the therapeutic regime by the patients, there was risk for exacerbation and poor control of chronic diseases and failure to achieve the therapeutic goals (Tuula et al. 2021).

Having in mind the rising complexity of the therapies, population ageing, and the growing multimorbidity the adverse drug effects persisted being a challenge to current health care (Coleman and Pontefract 2016). The rate and burden of adverse drug reactions varied depending on patients' characteristics (e.g. age, sex, ethnic origin, concomitant diseases, genetic or geographic factors) and on the medical product factors (e.g. type of medication, application mode, therapy duration, dose, and bioavailability). The rate was higher in elderly age and polypharmacy (Budnitz et al. 2021).

In one of their studies Camargo et al. found that the duration of therapy and the number of administered drugs were independent risk factors for occurrence of adverse reactions. Although those researchers did not reveal relationships between adverse drug reactions (ADR) and age, sex and number of diagnoses, we also established a considerable statistically significant correlation between the number of diagnoses and ADR rate when with increasing number of diagnoses led to increased ADR rate (Camargo et al. 2006).

Murray et al. and Wang et al. established a relationship between health state and non-adherence to therapy. The poor health state could diminish the patient's adherence to the therapy, as well as non-adherence could be the cause for the patient's poor health state (Murray et al. 2004; Wang et al. 2004).

Patients' knowledge of the indications of medicinal products was one of the factors affecting adherence to

therapy (Bosch-Lenders et al. 2016). It helped for a better control of the symptoms, good health state and good quality of life (Khayyat et al. 2018).

In our study we did not establish a statistically significant relationship between knowledge of MP indications and health state although 36.67% of the patients did not know the indications of the medicines they used. The poor knowledge of the indications of the medicinal products, though, according to Jankowska-Polańska et al., had a negative effect on adherence to the therapeutic plan and patients' behavior and was a substantial issue at control of chronic diseases (Jankowska-Polańska et al. 2016).

Manfrin et al. outlined that one of the ways to improve patients' knowledge of medicinal products was through providing the MR service (Manfrin et al. 2017). Besides enabling the pharmacists to enhance their currently restricted consultant role (Latif et al. 2011), the MR service had a confirmed positive effect towards improving the adherence to and improvement of the therapeutic effectiveness (Kharjul et al. 2018; Nabergoj et al. 2021; Manfrin et al. 2017).

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