

IMPACT OF PHARMACY STUDENTS ON ELDERLY PATIENTS' EDUCATION IN PROPER MEDICINE ADMINISTRATION

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Abstract

Progressive aging of the population is an inevitable fact, taking place especially in Europe. Elderly patients modify medicine dose on their own, abandon treatment or take extra, unprescribed drugs. Main aim of this study is to assess impact of training carried by pharmacy students on education directed at older people in terms of taken medicines. Research was conducted from November 2019 to March 2020 among people over 60 years old, from Poznań, Poland, seniors' clubs by two pharmacy students under the supervision of pharmacist. Study included 58 participants (89.5% women and 10.5% men). Two paper-based questionnaires were used. No. 1 checked the awareness and safety of the use of drugs by the respondents. After its completion, there was conducted 30 minutes long training. Then, No. 2 was issued for re-estimating the knowledge of patients and the effectiveness of the lecture. People with primary education, as well as over 80 years of age and living alone, need increased care during pharmacotherapy, due to more serious problems with the acquisition of knowledge. After the lecture, the number of people who knew how to prepare drugs before administration increased. The awareness that medications should be taken with water has also increased. The training significantly improved patients' knowledge about allergies to certain drugs and excipients. After the lecture, the respondents declared that they will not independently change the recommended doses of drugs. Training allowed to increase the knowledge in the field of proper medication intake. Therefore, it is worth to consider the knowledge and abilities of students to spread the initiative of pharmaceutical care and proper patient education.

Rezumat

Îmbătrânirea progresivă a populației este un fapt inevitabil. Pacienții vârstnici își modifică singuri doza de medicament, abandonează tratamentul sau iau medicamente suplimentare, neprescrise. Scopul principal al acestui studiu este de a evalua impactul educației realizate de studenții farmaciști asupra persoanelor în vârstă, în ceea ce privește medicamentele luate. Cercetarea a fost efectuată în perioada noiembrie 2019 până în martie 2020 în rândul persoanelor de peste 60 de ani, din cluburile seniorilor din Poznań (Polonia), de către doi studenți la farmacie, sub supravegherea farmacistului. Studiul a inclus 58 de participanți (89,5% femei și 10,5% bărbați). Au fost utilizate două chestionare pe hârtie. Nr. 1 a verificat gradul de conștientizare și siguranța consumului de medicamente de către respondenți. După finalizarea sa, s-a desfășurat un curs educațional de 30 de minute. Apoi, Nr. 2 a fost emis pentru re-evaluarea cunoștințelor pacienților și a eficacității prelegerii. Persoanele cu studii primare, precum și cele peste 80 de ani și care locuiesc singure, au nevoie de îngrijire sporită în timpul farmacoterapiei. După curs a crescut numărul persoanelor care au știut să își pregătească medicamentele înainte de administrare. A crescut și conștientizarea faptului că medicamentele trebuie luate cu apă. Instruirea a îmbunătățit semnificativ cunoștințele pacienților referitor la alergiile la anumite medicamente și excipienți. După curs, respondenții au declarat că nu vor schimba în mod voluntar dozele recomandate de medicamente. Instruirea a permis o îmbunătățire a educației în domeniul aportului adecvat de medicamente. Prin urmare, cunoștințele și abilitățile studenților pot fi utile pentru a răspândi inițiativa asistenței farmaceutice și a educației adecvate a pacientului.

Keywords: patient education, senior, pharmacy student, pharmaceutical care

Introduction

Elderly people are an increasing group of society. In 2013, they were 5.0% of the total population [25], while at the end of 2019, people over 65 constituted

18.1% of the total population in Poland [9]. Estimation shows that in 2035 people over 60 will be 25.0% of the population [36]. Progressive aging of the population is observed all over the world and takes place

especially in Europe [21]. It has financial implications for health care system, as this group of patients often generates high costs of pharmacotherapy [25, 30]. Elderly people represent a very specific group of patients. Reduced body hydration, increase in body fat, kidney and liver failure or lower concentration of plasma proteins cause altered drug distribution, elimination or mechanism of action. Mentioned changes, both in pharmacokinetics and pharmacodynamics, can potentially decrease efficiency of pharmacotherapy [25]. Additionally, at this stage of life, there are many changes for elderly people, such as loss of loved ones, deterioration of well-being, health problems and withdrawal from society. In many cases it causes stress, and demotivation for proper treatment [24, 25, 30]. Lack of compliance and drug adherence increases risk of multi-disease, the inherent element of which is undertaking further treatment, disease control or symptom relief [25, 31, 39]. Therefore, it is so important to ensure proper care and understanding, in particular for this group of patients. By introducing proper education, it is possible to help elderly patients take their medicines more efficiently [29]. It is confirmed that seniors often do not follow recommendations of the physician and pharmacist. They independently modify doses of drugs or refuse to take prescribed drugs or overdose them [25, 31, 40]. Providing training for people over 60 can bring a lot of positive effects, such as understanding important dependencies, and increasing the likelihood of compliance and drug adherence [35, 37]. This is why trainings organized by healthcare professionals are so important, both in Poland and worldwide. Thereby, huge potential carried by pharmacy and medicine students should be taken into consideration. They can effectively support the activities of physicians, pharmacists and nurses; therefore, their skills and knowledge are more and more often used in the training of seniors [26, 28]. Bearing in mind the increasing number of geriatric patients, their needs, as well as the existing burden of health care, conducting trainings by students seems to be justified. Such training should however take place under supervision of experienced professionals, especially if more advanced topics are considered [2]. Assessment of the impact of pharmacy students on education for people over 60 years old in terms of efficient pharmacotherapy is a pioneering subject in Poland. Worldwide observation shows that the inclusion of students in educational processes brings many positive results, both for the students' knowledge, their approach to patients, as well as in the awareness of the patients themselves. As a result, patients take their medications more properly with increased efficacy of pharmacotherapy and less observed adverse effects [4, 16, 28]. The aim of this study is to assess the impact of education carried by pharmacy students for people over 60 years old in terms of correct drug administration.

Materials and Methods

The research was conducted from November 2019 to March 2020 among people over 60 years old, from three Poznań, Poland, seniors' clubs. From September 2019 educational materials in the form of a multimedia presentation were prepared. Study included in general 58 participants (89.5% women and 10.5% men). Mean age of the respondents was 74.4 years. 63.8% of the respondents lived alone. 48.9% of respondents suffered from hypertension, about 9.0% had diabetes and asthma. 54.7% assessed their health condition as average and 32.1% as good. Two proprietary questionnaires were used in the study. Questionnaire No. 1 checked the awareness and safety of the drugs used by the respondents. After its completion, training took place, lasting about 30 minutes and including correct intake of medications and the related basic principles. The lecture was conducted by 2 students from the 5th year of the Pharmacy Faculty. Then, Questionnaire No. 2 was issued for re-estimating the knowledge of older people as well as the effectiveness and usefulness of the lecture. Before completing the questionnaire, the participants were informed about the purpose of the research, its anonymity, and the use of the results for scientific purposes. Project was approved by the Bioethics Committee No. 182/18 at the Poznan University of Medical Sciences. Questionnaire No. 1 consisted of 58 open and closed questions. The first six questions concerned general information about gender, age, education, residence, or health assessment. The rest of the section contained inquiries regarding the quality of pharmacotherapy and the handling of medicines and the cooperation of the patient with physicians and pharmacists. Questionnaire No. 2, completed after the training, contained 40 opened and closed questions. Visual materials were also prepared and presented during the training. It focused mainly on the principles of correct intake of preparations, their storage conditions, separating the dietary supplement from the drug, generic medicines, the phenomena of drug interactions with food and the basic definition of pharmaceutical care, indicating the cooperation of the patient with the pharmacist and physician.

The Statistica PL 12 (StatSoft) package was used to perform the statistical analysis. The correlations between analysed nominal data were performed by Chi-square test of independence. All statistical analyses were performed at $p < 0.05$.

Results and Discussion

Knowledge and awareness of taking medications

People included in the study took an average of 6 medications *per* day. All respondents bought drugs in a community pharmacy and did not use medicines belonging to another person. 35.7% of the respondents

took dietary supplements, most commonly women (Figure 1, $p = 0.0500$), and respondents who live with other people (Figure 2, $p = 0.0100$). 80.0% of respondents confessed that they do not use substitutes prescribed by a physician and these were most often people over 80 years of age (Figure 3, $p = 0.0300$).

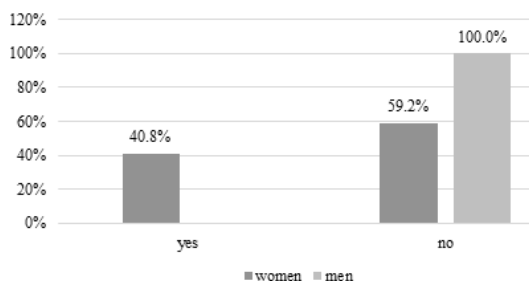


Figure 1.

Taking dietary supplements depending on gender (n = 55, $p = 0.0500$)

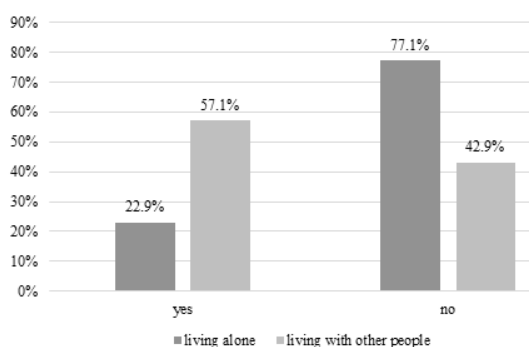


Figure 2.

Taking dietary supplements depending on the type of residence (n = 56, $p = 0.0100$)

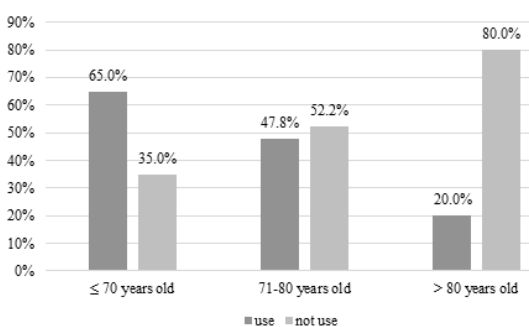


Figure 3.

Use of substitutes for medication prescribed by a physician depending on age (n = 58, $p = 0.0300$)

The impact of training led by students on the level of knowledge and the quality of pharmacotherapy

During the training, many important topics regarding the use of medicines were discussed. After the lecture, the number of people who knew how to prepare drugs before administration increased from 75.5% to 93.0%, with the greatest knowledge in this area before training among patients with hypertension (Figure 4, $p = 0.0200$). An important aspect of taking the medications correctly

is to drink them with water. The use of this liquid was declared by 86.0% of respondents, and after the lecture 98.0%. Participants were asked whether the information leaflets that came with the medicine were understandable.

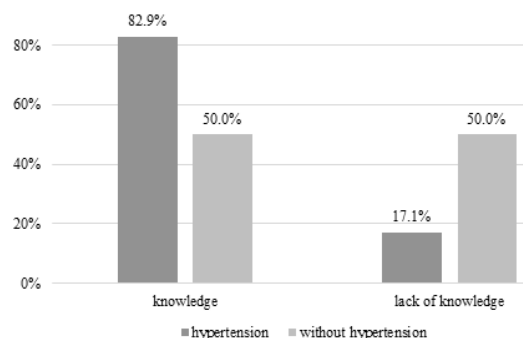


Figure 4.

Knowledge before training about preparation of some drugs before being taken depending on having a hypertension (n = 58, $p = 0.0200$)

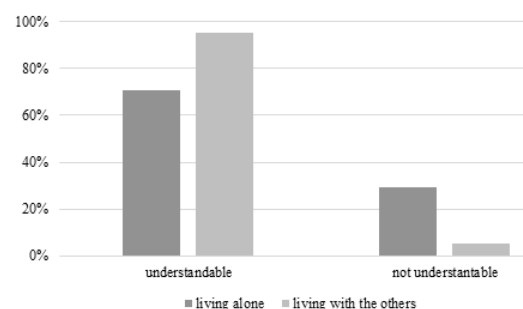


Figure 5.

Understanding of information contain in the drug leaflet before training depending on living alone or with other people (n = 54, $p = 0.0310$)

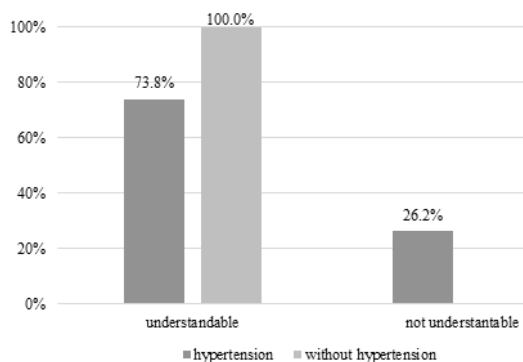


Figure 6.

Understanding of information contained in the drug leaflet before training depending on having or not having hypertension (n = 54, $p = 0.0470$)

It was noted that lonely people (Figure 5, $p = 0.0310$) and those suffering from hypertension (Figure 6, $p = 0.0470$) to a greater extent showed problems with acquiring knowledge from the leaflet before the training. After the training, which allowed them to

familiarize with the construction of the brochure and indicate how to use it, all respondents declared to understand the information contained in the leaflet about driving vehicles and the possibility of dividing the drug.

The lecture also included advice on the proper storage of medicines. After the lecture, it was possible to raise the level of knowledge in the field of suitable storage space to 98.0%, while people with primary education had lower knowledge in this area even after training (Figure 7, $p = 0.0110$). Knowledge about the time of use of preparations from their opening increased to 97.7%, and the best educational effects in this area were observed in women (Figure 8, $p = 0.0020$).

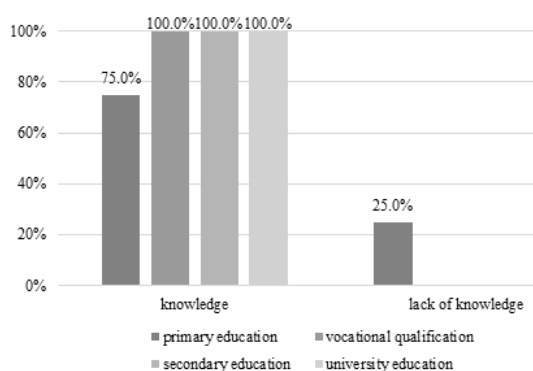


Figure 7.

Knowledge of storing of drugs after training depending on the education of patients (n = 48, $p = 0.0110$)

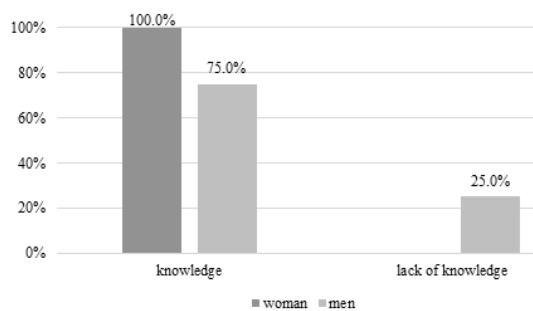


Figure 8.

Knowledge about the time of use of preparations after training from their opening depending on gender (n = 43, $p = 0.0020$)

The lecture allowed the participants to understand the importance of regularity in drug therapy because 90.0% of the respondents declared work on regular dosage, with the most convinced of this being people over 70 years of age (Figure 9, $p = 0.0140$). The training significantly increased patients' awareness of allergies to certain drugs and excipients especially in the case of women (Figure 10, $p = 0.0420$), and knowledge about the possibility of interactions between medicines and food (Figure 11, $p = 0.0095$). After the training, the problem of reading information from

the drug packaging decreased significantly from 38.6% to 9.5% (Figure 12, $p = 0.00020^*$).

According to the survey, 7.1% of respondents before training independently changed the prescribed drugs, and after the training, only 2.1% of respondents. After the lecture, the respondents declared that they would not independently change the recommended doses of drugs (Figure 13, $p = 0.0455$). When the message is not fully understood, the patient should ask a doctor or pharmacist in case of doubts regarding the use of medications. Interestingly, people who misjudged their health were the least willing to report it to the pharmacist (Figure 14, $p < 0.0001$). As a result of the training, the people confirmed that they would inform doctors and pharmacists about additional medications and allergies (Figure 15, accordingly $p = 0.0265$ and $p = 0.0051$). The training also resulted in the respondents' declaration that they would not connect prescribed medications with self-purchased preparations (Figure 16, $p = 0.0077$). It was shown that only participation in the training resulted in that the audience knew what pharmaceutical healthcare is about (Figure 17, $p = 0.0013$).

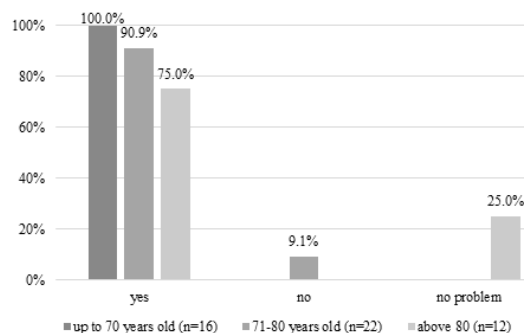


Figure 9.

Declaration of work on not forgetting to take medications (after the training), depending on the age of the respondents (n = 50, $p = 0.0140$)

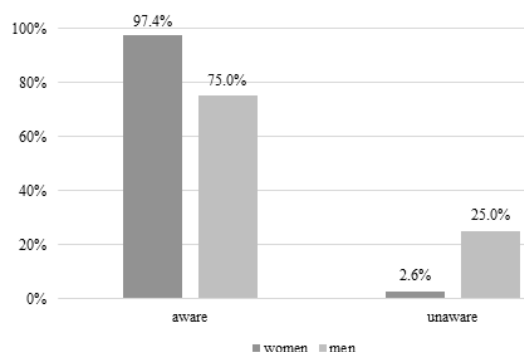


Figure 10.

Awareness of allergies to certain drugs and excipients (after training) depending on the gender of the respondents (n = 43, $p = 0.0420$)

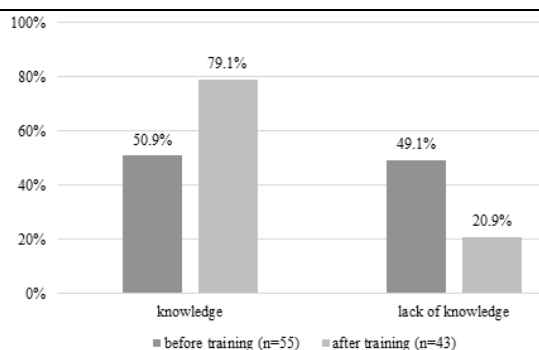


Figure 11.

Knowledge about possible interactions between medications and food before and after the training ($p = 0.0095$)

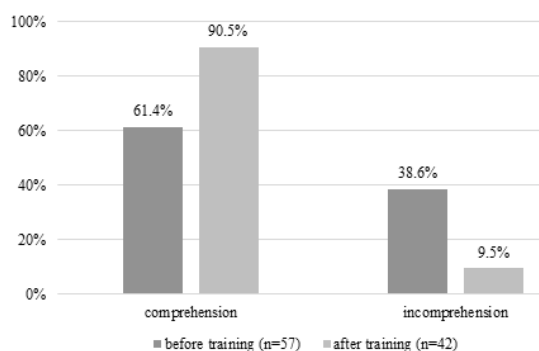


Figure 12.

Understanding and legibility of symbols placed on drug packages (before and after training) ($p = 0.0020$)

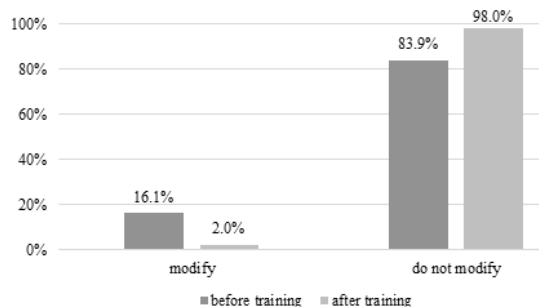


Figure 13.

Self-modification of the recommended doses of drugs by the respondents before and after the training ($n = 48, p = 0.0455$)

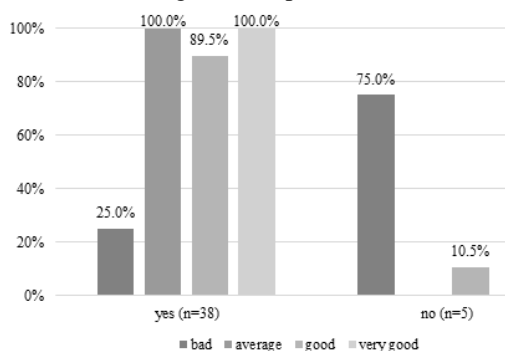


Figure 14.

Asking pharmacists in case of doubts regarding the medications taken (after the training), depending on the health assessment ($n = 43, p < 0.0001$)

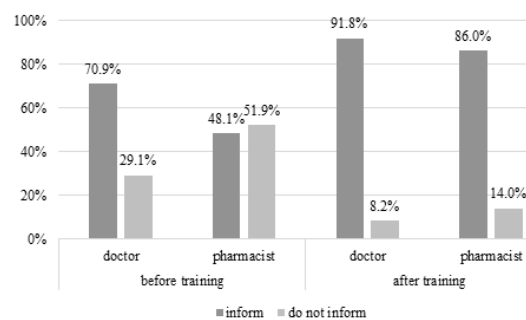


Figure 15.

Informing doctors ($p = 0.0265$) and pharmacists ($p = 0.0051$) about additional medications and allergies before and after the training

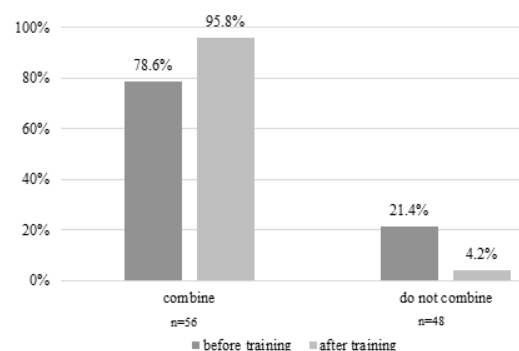


Figure 16.

Combine prescribed medication with products bought by respondents before and after training ($p = 0.0077$)

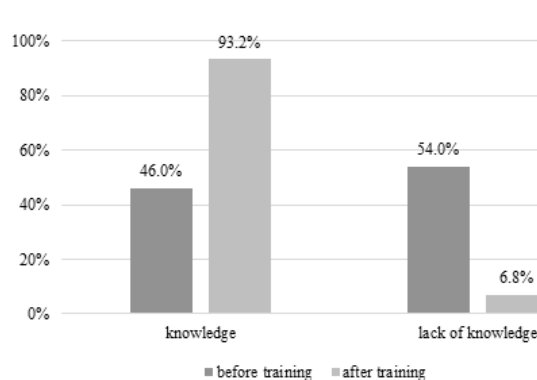


Figure 17.

Knowledge of term 'pharmaceutical care' before and after training ($p = 0.0013$)

The level of knowledge about the correct pharmacotherapy of people over 60 years of age is not always adequate, which can contribute to numerous mistakes. Any form of checking its condition, as well as trying to improve it, can bring many benefits. There is more and more said about the education of patients and their awareness in the treatment process. It is mentioned about the need to train older people to understand the condition and to provide them with proper treatment. New methods of education are also sought, including by creating individualized, patient-centred information materials. Based on the conducted

research, it was observed that education could take the form of a lecture given by pharmacy students, for example, in senior clubs. It was shown that the level of knowledge of participants about proper pharmacotherapy improved significantly. In many countries around the world, the potential of students is used, in the field of education, especially in the field of health prevention [19, 27].

Self-medication of patients is very popular; however, it can cause many adverse effects. It was noticed at work that women were more interested in the use of dietary supplements than men. This is not surprising, considering the attention of the female sex to her health and appearance to a greater extent [17, 35]. Publications confirm that more than half of the population uses dietary supplements regularly, choosing them on their own, but more often this applies to women [20, 23]. However, according to Chen et al., there were no significant differences in the use of supplements depending on the sex or marital status of seniors [8]. It is worth remembering that the habits of patients often determine the effects of treatment. Certain personal patterns are difficult to change, but by presenting the benefits and possible consequences of abnormal behaviour, it is possible to improve the patient's therapy [12]. Training is a prevalent form of patient education.

Holding lectures is very popular especially among seniors [7, 10, 34]. It is worth organizing the training in such a way as to summarize the knowledge of the participants at the end, for example using a multimedia quiz [10]. During the conducted study, this form of education was used. Important topics were discussed in the presentation, which in many aspects changed the knowledge of patients. During the training, it was possible to discuss many important pharmacotherapies' topics. As a result of the study, it was observed that after the lecture good knowledge of the preparation of some drugs was possible to increase. Interestingly, the greatest awareness in this area before the lecture was presented by patients with hypertension. In the literature, there is information about high self-discipline in these patients, which may translate into their better education [30].

Similar effects of training were observed when discussing the conditions of proper storage of drugs. As the results show, people with basic education had the most trouble in this area, even after the lecture. It is confirmed that such a group of patients often absorbs knowledge less well and needs more time for education [1, 18]. During the training, the structure of the leaflet and the principles of its correct use were also discussed. The study showed that patients consider it a valuable source of information, which has become clearer and understandable for them, especially after the lecture. Many articles emphasize that patients are increasingly using this form of knowledge [11, 22]. Important information can also

be found on the packaging of preparations. The key information ensuring the safety and quality of the preparation is the expiration date, so it is worth checking your medicines in this respect [3, 31]. This study shows that finding it is not a problem for patients, and its form is understandable to them, as well as for instructions on the possible time of use of the preparation. The work has shown that women use this data more easily. The study showed that after the training, the level of knowledge could significantly improve, and the multimedia form of the lecture is as effective as possible for this purpose, also in discussing the issue of an expired drug and giving it to the pharmacy. This is a very important and common problem because the drug is a specific type of waste that is hazardous and must be properly disposed of [31]. The work drew attention to regularity and accuracy in therapy. The study did not show any significant problem in this regard, and more important, after the training, the participants declared even more focus on this problem. The greatest interest in this topic could be boasted by people with secondary education and over 70 years of age. It is noted that men are more likely to forget about the correct intake of medications [1, 33]. Not taking the drug may be associated with difficulty swallowing, for example. This problem is much more common in elderly patients [25, 36]. The effectiveness of therapy is also the right choice of liquid used when taking the drug. The vast majority of respondents had such knowledge before the training and just extended it after. A good habit is to choose water to drink while swallowing the medication [6, 32]. The training discusses the negative effects of using other drinks while taking drugs, for example, tea, which contains tannins that reduce the absorption of many drugs. With juices, the danger of combining grapefruit juice with drugs is highly emphasized. Its metabolites often inhibit the metabolism of the drug, leading to an increase in the concentration of the active substance in the body [36]. Food can also affect the absorption of the preparation to an inadequate extent, which the patients did not know well. This may be due to the fact that the doctor omits these aspects during the visit. Hence patients do not attach importance to the correlation of the drug taken with the meal [22].

The key element of therapy is the patient's cooperation with doctors and pharmacists. During the training, great emphasis was placed on activating the patient in their own pharmacotherapy. Attention was also paid to the regularity of taking medications in accordance with the recommendation of a doctor and pharmacist. It is worth noting that patients in Poland use drugs irregularly. Hence education is very necessary for this area [6, 33]. A similar situation is with awareness of potential allergies. The lecture was a success, especially in the case of women, who in many cases care more about their own health. They declared that they would

provide such information to doctors and pharmacists. The lecture also emphasized the importance of informing about the additional medication used, thus increasing the safety of the therapy. In the case of the study of Misztal-Okońska *et al.* it was shown that every fourth patient informed the doctor about the additional preparations taken. The provision of such information by persons over 60 years of age is particularly important due to the higher incidence of adverse reactions [32]. A huge success of the study was also the declaration of the respondents that they would not combine the recommended drugs with those purchased independently. It is worth noting that sick people often change the medications, their form or dosage on their own. In the work of Derkacz *et al.*, it has been proven that patients reduce doses, take them less often, and also limit the number of drugs on their own [14]. Therefore, attention is paid to monitoring patients in this area, which can be helped by the pharmaceutical healthcare provided by pharmacists in many countries [3, 13, 38]. This is a relatively innovative topic in Poland. Hence the training discussed the principles of cooperation between doctors or pharmacists and patients, which resulted in raising the awareness of the respondents.

Conclusions

Effective training for people over 60 years of age in the proper use of medicines is very important and can bring many positive effects [30, 37]. Students of medical faculties, for example, pharmacy, where the positive effects of their activities have been confirmed in numerous studies around the world [5, 15], may be involved in this. Such activities can support education carried out by health care professionals and improve patients' quality of health and life. In addition, they increase the experience of future pharmacists, which will undoubtedly translate into their practice in a community pharmacy in the future.

Conflict of interest

The authors declare no conflict of interest.

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