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AREAS OF CONTINUING EDUCATION FOR PHARMACISTS ON THE CARE OF HIGH-RISK PATIENTS

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ABSTRACT

Introduction The presence of qualified pharmacists in community pharmacies ensures that high-risk patient groups receive safe and effective pharmaceutical care when using pharmacy services.

Material and methods This study employed a descriptive methodology. The research tool is a questionnaire, which includes 16 questions that describe to respondents' characteristics and assess respondents' attitudes toward continuous training in specialized fields. The number of respondents was 406. Data processing were performed using Excel software.

Results The majority of respondents (64,06%, CI_{95}: 59,37-68,7) believe that there is a frequent need for improving knowledge in the field of geriatrics, and 82.86% (CI_{95}: 79,53-85,99) of respondents fully agree that the community pharmacists should be well-informed in pediatrics. Pharmacists are aware of the responsibility they bear towards these categories of patients in community pharmacies and believe it is beneficial (63,01%, CI_{95}: 58,35-67,74) for them to periodically update their knowledge in specialized pharmaceutical care, covering a variety of topics.

Conclusions Pharmacists' views emphasized the importance of enhancing their professional training in delivering specialized pharmaceutical services. These findings support the development and implementation of the course "Specialized Pharmaceutical Assistance for High-Risk Patients" within pharmacists' continuing education programs.

Keywords Pharmacists, specialized pharmaceutical care, high-risk patients, professional development.

DOMENIILE DE EDUCAȚIE CONTINUĂ A FARMACIȘTILOR PRIVIND ASISTENȚA PACIENȚILOR CU RISC SPORIT

Introducere Prezența farmaciștilor calificați în farmaciile comunitare este garanția categoriilor de pacienți cu risc sporit, că vor primi îngrijiri farmaceutice sigure și eficiente atunci când utilizează serviciile farmaciei.

Material și metode Cercetarea efectuată este una de tip descriptiv, instrumentul de cercetare este chestionarul,aplicat la 406 respondenți, ce includea 16 itemi care descriu caracteristica respondenților și măsura în care sunt de acord sau nu cu procesul de formare continuă în domenii înguste. Prelucrarea datelor a fost efectuată prin intermediul softului Excel.

Rezultate Majoritatea respondenților (64,06%, ÎÎ95: 59,37-68,7) consideră că este necesară perfecționarea frecventă a cunoștințelor în domeniul geriatriei, iar 82,86% (ÎÎ95:79,53-85,99) dintre ei susțin în totalitate că farmacistul din farmacia comunitară să fie informat în domeniul pediatric. Farmaciștii sunt conștienți de responsabilitatea pe care o au față de aceste categorii de pacienți ai farmaciei comunitare și consideră că este în beneficiul (63,01%, ÎÎ95: 58,35-67,74) lor să își actualizeze periodic cunoștințele în domeniul îngrijirilor farmaceutice specializate, pe o diversitate de tematici.

Concluzii S-au evidențiat opiniile farmaciștilor privind necesitatea pregătirii lor profesionale în domeniul prestării serviciilor farmaceutice specializate și s-a argumentat elaborarea și implementarea cursului „Asistență farmaceutică specializată la pacienții cu risc sporit", în cadrul ciclurilor de perfecționare a farmaciștilor.

Cuvinte-cheie Farmaciști, îngrijiri farmaceutice specializate, pacienți cu risc sporit, perfecționare.

INTRODUCTION

Continuous professional training in pharmaceutical care is a legal and/or ethical requirement, as outlined in the Code of Ethics for pharmacists, which varies by country. The International Pharmaceutical Federation (FIP) defines continuous professional development as the „individual responsibility of the pharmacist for the systematic maintenance, development, and extension of knowledge, skills, and attitudes, to ensure ongoing competence as professionals throughout their careers" (1, 2). This refers a pharmacist's commitment to continually improving their skills, knowledge, and performance to benefit from career growth and professional satisfaction.

Community pharmacies must adhere to a series of regulations and standards to secure and maintain their position in the pharmaceutical market, and investing in their staff represents a key strategy in this regard.

In the Republic of Moldova, continuous education in the pharmaceutical field is mandatory throughout a pharmacist's entire career and is organized in different training formats regulated by the Ministry of Health (3).

The concept of continuous professional education in medicine and pharmacy is outlined in the Regulation on the organization and implementation of education and continuous professional development activities at the *Nicolae Testemițanu* State University of Medicine and Pharmacy of the Republic of Moldova. It encompasses "a series of planned educational activities aimed at maintaining, updating, and developing the knowledge, behavior, and professional attitudes necessary for doctors and pharmacists to perform their professional activities effectively. Simultaneously, through the continuous development of individual performance, these activities aim to achieve a real improvement in the quality of medical and pharmaceutical services provided" (4).

The presence of qualified pharmacists in community pharmacies guarantees that pharmacy patience will receive safe and effective pharmaceutical care when using pharmacy services.

The target groups of patients to whom pharmaceutical services are directed are high-risk groups, including the elderly, children with their legal representatives, and patients with rare diseases, due to their specific characteristics in medication use. The vulnerability of the elderly and children is determined by various factors that influence medication administration as well as issues related to their irrational use, especially in outpatient settings (5, 6). In addition to the specific biological characteristics of pediatric or geriatric patients, such as metabolism, age, and bioavailability, the proper use of medications for these patients is influenced by several factors. These include the lack of age-appropriate dosage forms, the use of "off-label" medications, the rising use of dietary supplements that have not been studied for these patient groups, and, last but not least, the patient's adherence to and compliance with treatment (7).

Providing specialized pharmaceutical services to elderly individuals, while considering the factors and characteristics mentioned, helps identify, resolve, and prevent medication-related problems (8, 9).

Planning pharmaceutical services that meet the individual health needs of elderly individuals or children requires the implementation of specialized pharmaceutical age specific care. The implementation of these services requires an integrated, multidisciplinary approach and collaboration among healthcare professionals. Specialized pharmaceutical care for these patient groups involves pharmacists' actions or interventions in community phar-

macies focused on evaluating, preventing, and reducing risks associated with irrational medication use while enhancing the benefits of drug therapies. The development and implementation of such pharmaceutical services involve three key steps: identifying the medication-related problems that need to be addressed, selecting effective interventions to resolve these issues, and implementing, monitoring, and evaluating the impact of these interventions in community pharmacies (10, 11).

Therefore, it highlights the necessity for pharmacists to possess comprehensive knowledge in addressing the specific medication-related needs of elderly patients, children, and those with rare diseases, while also improving the delivery of information to ensure that the specific requirements of these patients are adequately considered.

In the Republic of Moldova, there are no specialized programs for pharmacists in specialized areas of training, such as geriatrics, pediatrics, or assistance for patients with rare diseases. For instance, in the United States, the majority of training required to become a specialist in geriatric pharmacy occurs subsequent after completing pharmacy school. A common way to become a specialist is to complete a residency in geriatric pharmacy. Residency experiences are elective in the field of pharmacy, but they serve to provide intensive training experiences. A residency in geriatric pharmacy allows the trainee to be immersed in the field of geriatrics by providing experiences in long-term care, ambulatory care, and acute care settings, all focusing on providing care for elderly individuals. All states require a license to practice pharmacy, and there are some differences from state to state that would require a license transfer. State pharmacy boards use several components in their licensing process, one of which is the NAPLEX exam administered by the National Association of Boards of Pharmacy (12).

After practicing in the field of geriatrics, pharmacists may also wish to become board-certified geriatric specialists. To obtain this certification, pharmacists must pass an exam from the Board of Pharmacy Specialties, which focuses on providing healthcare to elderly adults. In order to maintain their certification, pharmacists may either retake the examination every seven years or engage in continuing education courses specifically focused on geriatrics (12, 13).

Data on the need to prepare students and practitioners to provide pharmaceutical care to the elderly population are highlighted in the work „*Geriatric pharmacy education: a strategic plan for the future*" (14) presented by a group of authors who indicate that the care of elderly individuals is an essential component of the education of all pharmacists. In this regard, in the mid-1980s, the Office of Health Professions developed a model curriculum in geriatric pharmacy.

American College of Clinical Pharmacy which supports practitioners, scientists, educators, and other professionals involved in clinical pharmacy and pharmacotherapy, including in pediatric clinical pharmacy (*ACCP Pediatrics PRN*), emphasizes in its Opinion Paper, recommendations aimed to improve both the quality and quantity of education in pediatric pharmacy, such as: increasing the minimum expectations for pharmacists entering practice to provide pediatric care; standardizing education in pediatric pharmaceutical care; expanding the number of pediatric clinical pharmacists; creating an infrastructure for the development of pediatric clinical pharmacists and clinician scientists (15).

Subsequently, professional organizations, such as the American Association of Colleges of Pharmacy (AACP), in collaboration with the American Society

of Consultant Pharmacists (ASCP), American Geriatrics Society (AGS), American Association of Colleges of Nursing (AACN) and the Institute of Medicine (IOM) have significantly contributed to the development of geriatric pharmaceutical education (14).

Additionally, the guidelines of the Accreditation Council for Pharmacy Education (ACPE) emphasize that every graduate pharmacist must be prepared to provide direct pharmaceutical care to patients across a wide variety of healthcare domains, with the responsibility to ensure optimal and safe therapy outcomes for a wide range of patients. As a result, ACPE asserts that this competency can be attained through the development of a solid training foundation, including understanding specific populations, such as pediatric or geriatric patients, and related prescription and non-prescription pharmacotherapy, population-specific dosage calculations and adjustments, and the monitoring of rational use of medications (15).

Based on the aforementioned, the objective of this study has been defined as follows: to evaluate the attitudes of practicing pharmacists in the Republic of Moldova regarding continuous education in these fields, in order to highlight the importance and necessity of a specialized training course in pharmaceutical care for these patient groups.

MATERIAL AND METHODS

The present study employed a quantitative and descriptive research design to investigate pharmacists' attitudes toward continuous pharmaceutical education, with a focus on high-risk patient groups such as the elderly, children, and individuals with rare diseases. A case series approach was used as a descriptive methodology aimed at identifying and analyzing trends and characteristics among pharmacists involved in delivering specialized pharmaceutical services. This method allowed for a detailed examination of participants' professional experiences and practices, offering valuable insights into the continuing education needs associated with the care of high-risk patients. Elderly patients were of particular interest due to the numerous risks posed by irrational medication use, especially in outpatient settings.

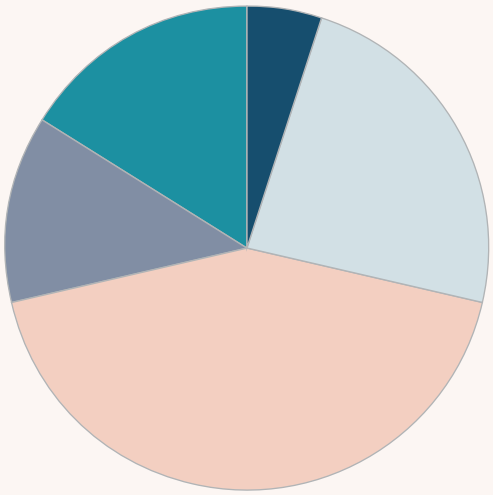
The study was conducted over a two-year period (2022–2024) and involved a sample of 406 specialist pharmacists working in community pharmacies. To determine the minimum representative sample size, Cochran's formula was applied using the following parameters: a total pharmacist population of 1.873 (as reported by the National Bureau of Statistics in 2023), a 95% confidence level (Z = 1.96), a 5% margin of error, and an estimated population proportion of 0.5. The resulting adjusted sample size for this population was approximately 319 pharmacists.

Data were collected using a structured, anonymous questionnaire to ensure objectivity of responses. The questionnaire included 16 closed-ended items: three questions pertained to demographic characteristics, while 13 assessed respondents' levels of agreement or disagreement with statements regarding continuous training in specialized fields.

Microsoft Excel was used for data entry and statistical processing. Descriptive statistics, including frequencies and percentages, were applied to summarize participants' responses and highlight patterns in preferences for continuing education in specialized pharmaceutical care.

RESULTS

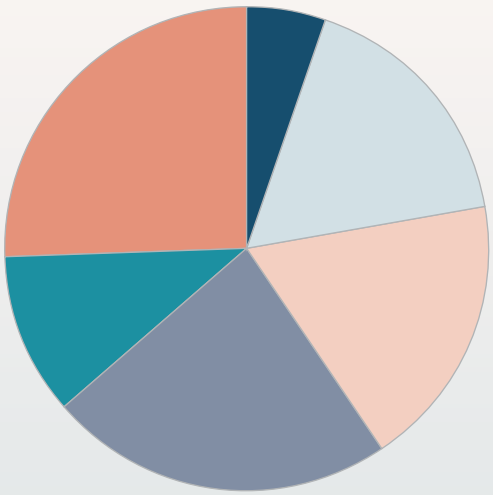
The majority of respondents are specialists aged between 31 and 40 years (42.60%, CI_{95}: 37.8-47.4), had over 21 years of professional experience (25.40%, CI_{95}: 21.14-29.6) and work in urban environments (86.50%, CI_{95}: 83.12-89.78) (see Figures 1-3).



Color	%	Age category
	5.20	61-70 years
	23.60	20-30 years
	42.60	31-40 years
	12.60	41-50 years
	16.00	51-60 years

Figure 1. Age category of the respondent pharmacists.

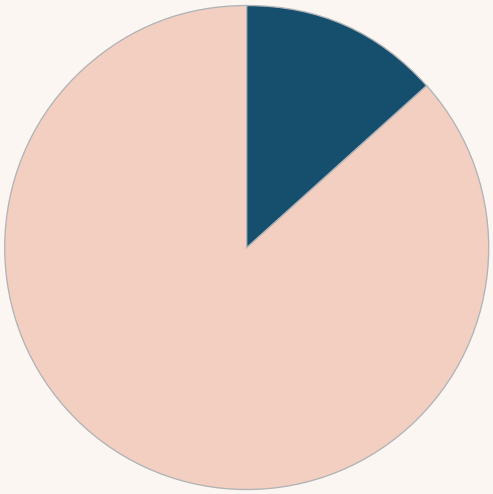
The largest age group among respondent pharmacists is 31-40 years, comprising 42.6% of the total. The second most represented group is 20-30 years, making up 23.6%. Pharmacists aged 51-60 years account for 16%, while those aged 41-50 years represent 12.6%. The smallest category is 61-70 years, with 5.20% of respondents.



Color	%	Experience
	5.40	Up to one year
	17.00	1-5 years
	18.20	6-10 years
	23.20	11-15 years
	10.80	16-20 years
	25.40	>21 years

Figure 2. Professional experience of the respondent pharmacists.

The largest group consists of pharmacists with more than 21 years of experience, representing 25.4% of respondents. Those with 11-15 years of experience make up 23.2%, while 6-10 years accounts for 18.2%. Pharmacists with 1-5 years of experience represent 17.0%, and those with 16-20 years make up 10.8%. The smallest category includes pharmacists with less than one year of experience, comprising 5.4% of respondents.

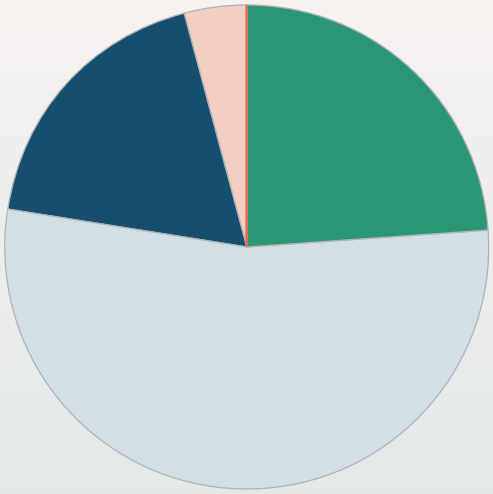


Color	%	Work areas
	13.50	Rural
	86.50	Urban

Figure 3. Work environment of the respondent pharmacists.

The majority of respondent pharmacists work in urban areas, accounting for 86.5% of the total. In contrast, 13.5% of pharmacists work in rural areas.

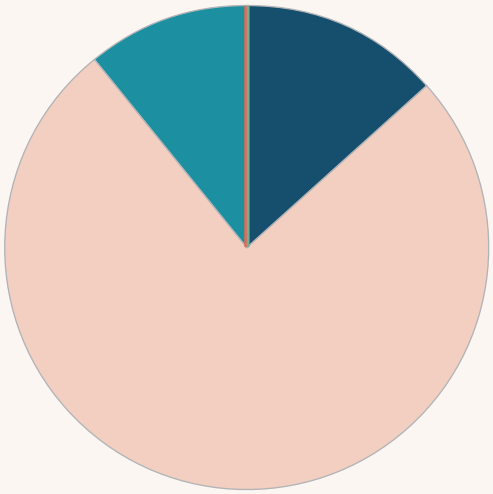
The majority of respondents indicated that they agree that the elderly follow the pharmacist's recommendations regarding the use of medications – total agreement of 23.90% (CI_{95}: 19.74-28.04) and partial agreement of 53.70% (CI_{95}: 48.84-58.54) (Fig. 4). 75.68% (CI_{95}: 71.44-79.79) of the respondents indicated that the elderly often follows their advice regarding medication administration in outpatient settings (Fig. 5). Additionally, more than half of the respondents – total agreement of 21.90% (CI_{95}: 17.89-25.94) and partial agreement of 53,20% (CI_{95}: 48.34-58.06) claim that they are able to monitor the medication of elderly patients, including OTC, Rx, and potentially dangerous drugs, and can provide specific recommendations when necessary (Fig. 6).



Color	%	Agree/degree recommendations
	0.00	Total disagreement
	23.90	Total agreement
	53.70	Partial agreement
	18.50	Neutral
	3.90	Partial disagreement

Figure 4. To what degree do you agree that elderly patients follow the pharmacist's recommendations regarding medication use?

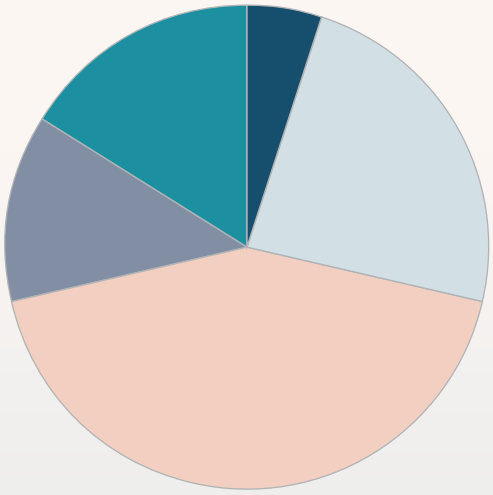
The majority of respondents expressed partial agreement (53.7%), indicating that elderly patients generally follow pharmacists' recommendations regarding medication use. A significant portion (23.9%) reported total agreement, while 18.5% remained neutral. Partial disagreement was noted by 3.9% of respondents, and none (0%) indicated total disagreement.



Color	%	Follow recommendations
	0.00	Never
	13.51	Very often
	75.68	Often
	10.81	Rarely
	0.00	Very rarely

Figure 5. How often does the elderly patient follow your advice regarding medication use?

The majority of respondents indicated that elderly patients often follow pharmacists' advice regarding medication use (75.6%). A smaller portion reported that patients follow recommendations very often (13.5%), while 10.8% noted that adherence occurs rarely. No respondents indicated very rarely or never.



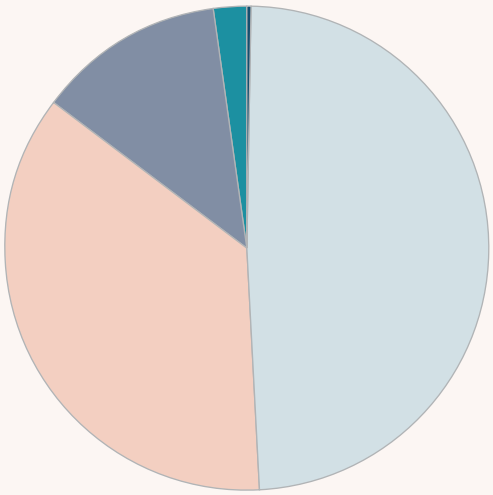
Color	%	Agree/degree monitoring
	2.50	Total disagreement
	21.90	Total agreement
	53.20	Partial agreement
	18.20	Neutral
	4.20	Partial disagreement

Figure 6. To what degree do you agree that the pharmacist is capable of monitoring the elderly patient's medication and intervening, when necessary, with specific recommendation?

The majority of respondents (53.2%) expressed partial agreement, suggesting that pharmacists are generally capable of monitoring elderly patients' medication and providing necessary interventions. 21.9% reported total agreement, indicating strong confidence in pharmacists' ability to manage medication use. 18.2% remained neutral, while 4.2% expressed partial disagreement, and 2.5% indicated total disagreement.

The number of drugs registered in the state drug registry is constantly increasing, along with the variety of dietary supplements used as adjunctive treatments. However, as the range of both drugs and dietary supplements expands, the responsibility of the community pharmacist increases proportionally, because many of these products have not been tested for use in high-risk patient groups, such as children and the elderly. Pharmacists have expressed their total agreement (48.8%, CI_{95}: 43.90-53.63) and partial agreement (36.2%, CI_{95}: 31.53-40.88) on the relationship between the quality of pharmaceutical

care for the elderly and the effectiveness of pharmacists' ongoing professional education (Fig. 7), that helps pharmacists enhance their skills in managing age-related minor health conditions, recognizing drug interactions, and providing personalized care, minimizing risks associated with polypharmacy and adverse drug reactions etc.

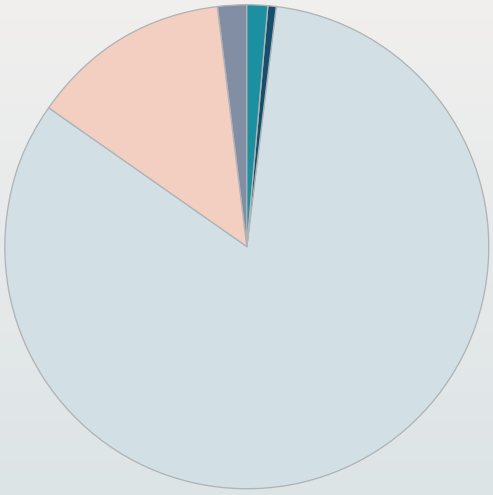


Color	%	Agree/degree that the quality of care depends on the pharmacists' performance
	0.50	Total disagreement
	48.80	Total agreement
	36.20	Partial agreement
	12.60	Neutral
	2.00	Partial disagreement

Figure 7. To what extent do you agree that the quality of geriatric pharmaceutical care depends on the pharmacists' performance obtained through continuous professional training?

The majority of respondents (48.8%) expressed total agreement, indicating strong confidence that the quality of geriatric pharmaceutical care depends on pharmacists' performance gained through continuous professional training. 36.2% reported partial agreement, 12.6% remained neutral, 2.0% expressed partial disagreement and 0.5% indicated total disagreement.

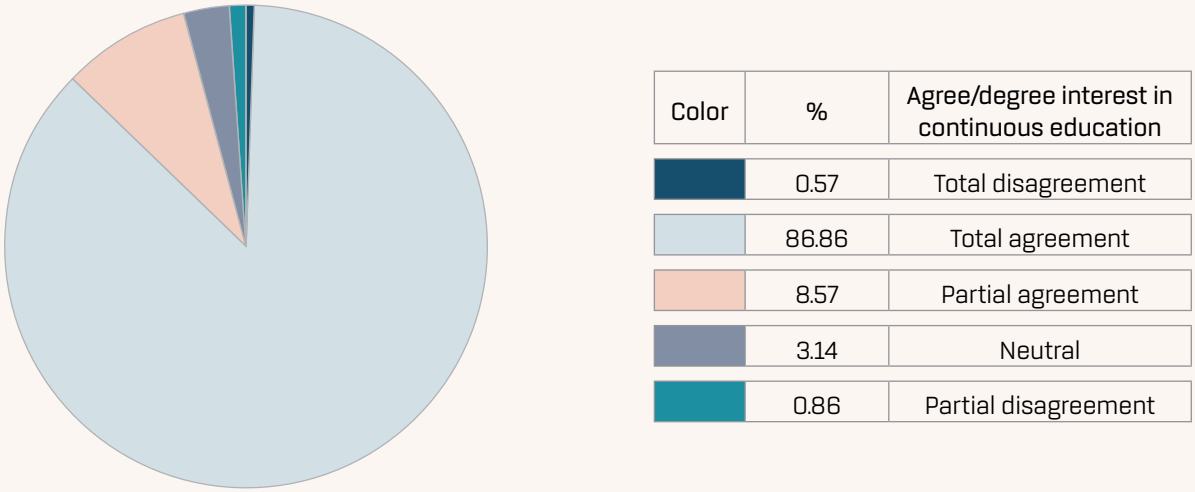
This understanding is reflected in pharmacists' attitudes. Thus, 82.86% (CI_{95}: 79.53-85.99) of respondents agree with the statement: „It is important for the community pharmacist to be informed in the field of pediatrics" (Fig. 8). Additionally, 86.86% (CI_{95}: 84.04-89.36) of respondents agree with continuous education in the field of pediatric medication (Fig. 9).



Color	%	Agree/degree informing the community pharmacist about pediatrics
	0.57	Total disagreement
	82.86	Total agreement
	13.43	Partial agreement
	1.71	Neutral
	1.43	Partial disagreement

Figure 8. The importance of informing the community pharmacist about pediatrics.

The majority of respondents (82.86%) expressed total agreement, emphasizing the high importance of informing community pharmacists about pediatrics. 13.43% reported partial agreement, 1.71% remained neutral, while 1.43% expressed partial disagreement, and 0.57% indicated total disagreement.



Color	%	Agree/degree interest in continuous education
	0.57	Total disagreement
	86.86	Total agreement
	8.57	Partial agreement
	3.14	Neutral
	0.86	Partial disagreement

Figure 9. Interest in continuous education in the field of pediatric medication.

The majority of respondents (86.86%) expressed total agreement, highlighting strong interest in continuous education in the field of pediatric medication. 8.57% reported partial agreement, 3.14% remained neutral, while 0.86% expressed partial disagreement, and 0.57% indicated total disagreement.

In the context of pediatric medication, several areas for continuous improvement were identified. Specifically, the following areas of interest were highlighted: „Methods of calculating drug dosages for children or for *„off-label"* medications (71.43%, CI_{95}: 67.03-75.82); "Evaluating the appropriateness of the prescribed pediatric dose according to the child's age" (60.1%, CI_{95}: 55.34-64.86); „Selecting the most appropriate form of administration for pediatric prescriptions" (47.21%, CI_{95}: 52.15-42.43); „Counselling parents, guardians, or legal representatives of the child regarding medication administration techniques and potential side effects of medications prescribed to children" (53.44%, CI_{95}: 48.60-58.30); "Methods of direct communication with pediatric patients to increase treatment adherence" (52.71%, CI_{95}:47.85-57.57). This indicates an increased interest in the topic of training related to high-risk patient care.

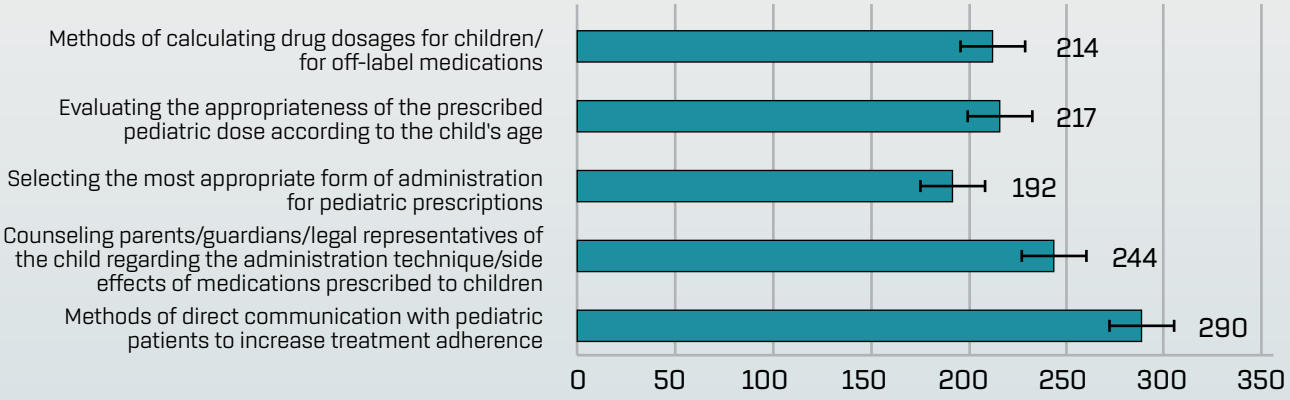


Figure 10. Areas of interest for continuous improvement in the field of pediatric medication.

The most emphasized area of professional interest is the calculation of drug dosages for children, including off-label medications (290 responses). Evaluating the appropriateness of the prescribed pediatric dose according to the child's age is also highly prioritized (244 responses). Additionally, counselling parents, guardians, or legal representatives on administration techniques and potential side effects plays a crucial role (217 responses). There is also considerable interest in methods of direct communication with pediatric patients to improve treatment adherence (214 responses). Lastly, selecting the most appropriate form of administration for pediatric prescriptions remains an area requiring ongoing attention (192 responses).

Since pharmacists are service providers dedicated to supporting the health and well-being of these patient groups, it is essential for them to enhance their values, knowledge, and skills through various avenues of continuous professional development. The rigorous regulation of continuous professional training ensures that pharmacists expand their expertise and knowledge, update their existing skills, and acquire new methods for performing tasks in the community pharmacy, as the profession assumes various roles within health services. The majority of respondents (64.06%, CI_{95}: 59.37-68.7) consider that there is often a need for improving knowledge in the field of geriatrics; only 43 respondents indicated that it is rarely needed, one respondent said very rarely, and two said never (Fig. 11). These findings suggest that pharmacists are aware of the responsibility they bear towards the visitors of the community pharmacy. Additionally, they recognize the benefit of periodically updating their knowledge in the field of geriatric pharmaceutical care, with the majority expressing total agreement (63.01%, CI_{95}: 58.35-67.74) and 30% (CI_{95}: 25.58-34.50) indicating partial agreement. Only 5 respondents disagreed (Fig. 12).

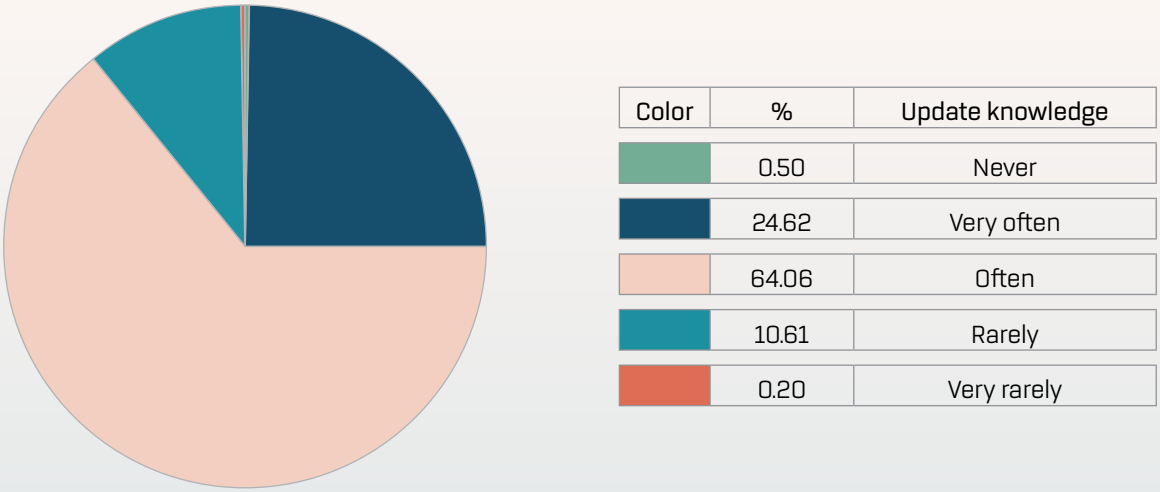


Figure 11. Indicate how often the pharmacist should update their knowledge in the field of geriatrics.

The majority of respondents (64%) believe that pharmacists should update their knowledge in geriatrics often. 24.6% consider it necessary to update knowledge very often, 10.6% think updates should occur rarely, while 0.2% suggest very rarely, and 0.5% believe it is never necessary to update knowledge in this field.

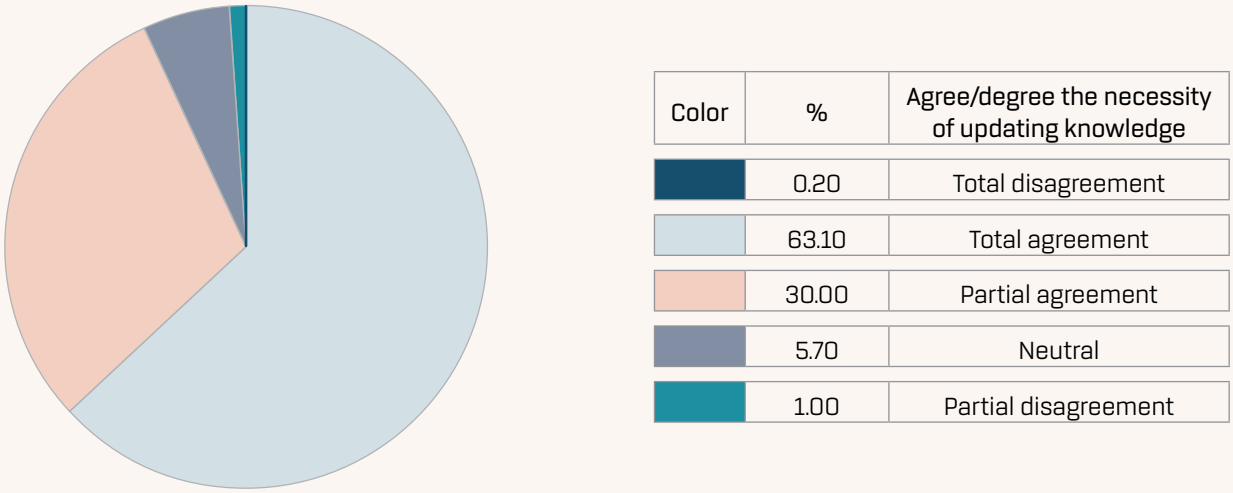


Figure 12. Please state your agreement regarding the necessity of updating knowledge in the field of geriatrics.

The majority of respondents (63.1%) expressed total agreement, emphasizing the necessity of updating knowledge in the field of geriatrics. 30% reported partial agreement, 5.7% remained neutral, while 1% expressed partial disagreement, and 0.2% indicated total disagreement

In response to the question regarding the topics for continuous training in geriatric pharmaceutical care, more than half of the respondents indicated the following: potentially dangerous medications for the elderly, specificities of pharmacotherapy in the elderly, drug interactions, controlled self-medication in the elderly, communication with the elderly patients, polypharmacy, and healthy nutrition for age-related diseases (Tab. 1).

Table 1. The continuous training topics for providing geriatric pharmaceutical care.

Answer options	Respondents (%)	CI_{95}
Specificities of pharmacotherapy in the elderly	65.1	60.45-69.75
Controlled self-medication in the elderly	60.1	55.37-64.92
Compliance/adherence to treatment in the elderly	42.3	37.51-47.14
Potentially dangerous medications for the elderly	72.8	68.43-77.11
Communication with the elderly	56.7	51.85-61.51
Drug interactions	61.1	56.38-65.89
Healthy nutrition for certain diseases in the elderly	50.7	45.87-55.62
Detection, monitoring, and analysis of adverse reactions	38.4	33.62-43.01
Polypharmacy	55.4	50.59-60.29
Promotion of an active lifestyle	45.8	40.93-50.65
Including family members in ensuring medication therapy	32.9	28.34-37.50

DISCUSSIONS

The results of this study underscore the importance of continuous pharmaceutical education, particularly in the context of providing care for high-risk patient groups such as the elderly, children, and individuals with rare diseases. These populations face significant risks associated with irrational medication use – especially in outpatient settings – which highlights the crucial role of pharmacists in managing drug therapies and preventing complications.

Continuous professional education is perceived as a key factor in optimizing specialized pharmaceutical care for elderly patients, with pharmacists acknowledging its positive impact on the quality of services provided to this group. The findings highlight a need for enhanced training in managing drug interactions, polypharmacy, and adverse drug reactions – critical components for ensuring the safety of older adults.

In the field of pediatric medication, the study indicates a high level of interest among pharmacists in continuous training, particularly in the correct dosing and counselling of parents regarding medication administration and its effects. Parental counselling plays a distinct role in this regard, and training pharmacists to improve this interaction can have a significant impact on treatment adherence.

In conclusion, the findings not only emphasize the importance of continuous pharmaceutical education but also demonstrate pharmacists' active interest in advancing their expertise in caring for high-risk patients. Strengthening knowledge in geriatrics and pediatrics is essential for improving pharmaceutical care, ensuring the safe use of medications, and supporting pharmacists' ongoing professional development as healthcare providers.

CONCLUSIONS

1. The study highlighted pharmacists' views on the importance and necessity of strengthening their professional training in delivering pharmaceutical care to high-risk patient groups throughout the medication process.
2. The development and implementation of the course *Specialized Pharmaceutical Assistance for High-Risk Patients* within pharmacists' continuous professional training cycles were justified by the findings.
3. Investing in the development of pharmaceutical personnel and involving them in the provision of healthcare services for high-risk individuals would help meet the specific medication needs of these patients and improve the management of their treatment in outpatient settings.

CONFLICT OF INTEREST

The authors have no conflicts of interest to declare.

ETHICS APPROVAL

This study was conducted within the framework of the following scientific research projects:

1. „Management of pharmaceutical care for the elderly", minutes of the Research Ethics Committee no. 52 at no. 62 dated 18.06.2015;
2. „Peculiarities of pharmaceutical care for children in outpatient and inpatient conditions", minutes of the Research Ethics Committee no. 75 at no. 81 dated 19.06.2018.

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