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Community pharmacists' support for nursing mothers in Serbia: potential cost savings due to breastfeeding continuation

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Abstract

Background Despite many health benefits to infants, the overall breastfeeding rate remains low among Serbian women. The community pharmacists' efforts aimed at supporting nursing mothers are important. The aim of the study was an evaluation of the pharmacists' training for breastfeeding support and their perception about its usefulness. The second aim was an evaluation of the provided structured pharmaceutical care service (SPS) over four months, through a calculation of theoretical cost savings for counseled families in case of the risk for introduction of commercial milk formula (CMF).

Methods The continuation of breastfeeding instead of starting with CMF was theoretically monetized through cost savings analysis, which is based on energy equivalent human milk and CMF, regardless of the differences in health, social and ecology outcomes of breastfeeding. Cost savings for the counseled families were calculated as financial differences between continuing breastfeeding and switching to CMF.

Results The 256 pharmacists showed high satisfaction rates with the quality and the usefulness of the training (mean scores: content value 4.89 ± 0.51, technical value 4.91 ± 0.41, program value 4.96 ± 0.20, and usefulness value 4.94 ± 0.25, respectively), as well as a statistically significant higher level of knowledge ($p < 0.001$ for each of the 10 questions). The prospective observational study enrolled 256 community pharmacists who voluntarily underwent training aimed to breastfeeding support. Of all the trained pharmacists, 151 (59%) actively provided 1,243 SPS focused on breastfeeding support. Of all, 599 mothers of children under 6 months of age received SPS, while 590 provided full data In 275 cases (22.1%), a risk for early breastfeeding cessation was identified. The average age of children whose mothers had undergone SPS was 2.83 months, and the total average potential cost savings until 6 months of children age was 35,884.80 RSD (approximately 306 EUR) for average of 3.17 months.

Conclusions The training of pharmacists adds significant value to their knowledge and skills for breastfeeding support, which may lead to potential cost savings for families.

Keywords Community pharmacist, Breastfeeding, Educational training, Counseling, Cost savings

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Introduction

Breastfeeding initiation and duration rates remain low worldwide, although breast milk provides uniquely tailored nutrition with health benefits for the child. This natural and personalized milk contains plenty of immune-modulatory, anti-inflammatory and active components, which meet al.l the needs of growing babies, supporting their cognitive and psychomotor development. Numerous studies have demonstrated that breastfeeding reduces both short-term and long-term health risks for infants [1]. In addition, ecologists highlight the environmental benefits due to one particular reason: breastfeeding uses few resources and produces minimal or zero waste, with huge savings of carbon dioxide ($C0_2$) per baby compared with commercial milk formula (CMF) [2]. Breastfed children have a lower incidence of respiratory tract infections, otitis media, and gastrointestinal infections, compared to non-breastfed [3]. Besides, as natural, essential, and universal nutrition, breastfeeding helps the child to lower the risk for allergic rhinitis, type 2 diabetes, and obesity. Additionally, there are also benefits for the nursing mother, such as reduced risk of reproductive cancers and type 2 diabetes, as well as noncommunicable diseases [4, 5]. The World Health Organization (WHO) strongly advocates exclusive breastfeeding for the first six months of an infant's life as a public health measure, followed by continued breastfeeding for at least two years [6]. Although, this recommendation shows variability, the average is around six-month. Still, only 44% of infants under six months of age are exclusively breastfed according to report from 2021, but with a target rates of 70% by 2030 [7]. At the same time, there is a global increase of CMF in human diets due to intensive marketing of the industry, which clashes with the natural choice of nutrition for infants [8]. The duration of breastfeeding has a significant long-term influence on a child's health, which makes breastfeeding-supporting activities important during early initiation, and breastfeeding duration, including exclusivity of breastfeeding and, prevention of precociously cease [4]. However, the decision to cease breastfeeding can be made due to various reasons, including the aggressive marketing of CMF products, inadequate support from family, friends, and healthcare professionals, along with lingering doubts and misconceptions regarding pharmacotherapy, and social and cultural attitudes. Frequently, mothers report anxiety regarding harmful effects on their babies during pharmacotherapy treatments as a reason for breastfeeding cessation [9]. However, we cannot exclude chronic health issues or certain acute health problems during lactation, such as migraines, emergency contraception, microbial or viral infections. Therefore, nursing mothers are interested in whether over-the-counter (OTC) or prescription drugs might represent a risk for the infant and/or lactation. Consequently, their dilemmas regarding the safety of the child could lead to a shortening of breastfeeding duration.

The known medicines that represent a contraindication for breastfeeding are iodine > 150mcg/day, retinoid, cytostatic drugs, amiodarone (except single dose), and gold salts [10]. For all other drugs, there is a need for an individual assessment of the risk/benefit ratio. A pharmacist with adequate knowledge and competence could provide structured pharmaceutical care services (SPS) aimed at supporting breastfeeding and prolonging its duration. The systemic review of Renfrew et al. elucidates the effectiveness of educational activities and support for nursing mothers, resulting in a substantial increase in breastfeeding rates [11]. Furthermore, there is limited evidence suggesting that educational interventions delivered to a multidisciplinary staff group can enhance the knowledge of healthcare professionals and consequently foster higher initiation rates and longer durations of breastfeeding. It is indisputable that breastfeeding is a physiological process, regulated by hormones and supported by the contact of the infant and the mother, but the consumer needs of nursing women can be the reason to design new breastfeeding support activities, in accordance with the needs that have not been met until now. Interventions based on mobile-health showed significant improvements in breastfeeding efficacy and a reduction of health problems in infants, but also changed attitudes toward breastfeeding, with a positive influence on breastfeeding rates [12]. To better understand the economic aspects of breastfeeding, there is a need for a multidisciplinary approach and identification of various costs and associated factors. Whelan et al. suggest that healthcare providers believe that financial incentives themselves could have both positive and negative impacts. Those findings give direction to complex activities to provide better solutions aimed at increasing the rate of breastfeeding [13].

According to the data published by the UNICEF Belgrade (report from 2019), early initiation of breastfeeding is present among only 8% of newborns (urban area 6%, other 10%), and exclusive breastfeeding among 24%of infants aged 0–5 months in the overall population of Serbia [14]. The rate of breastfed children in Serbia is even lower than in the surrounding countries. There is not obligatory prenatal education regarding breastfeeding in Serbia, although voluntary prenatal education is available at primary healthcare level, including information regarding breastfeeding. In addition, mothers should be given instructions after the delivery regarding the postnatal care. In practice a lot of nursing mothers or their family members visit pharmacist for counseling. The Ministry of Health of the Republic of Serbia intensified its activities to promote breastfeeding in 2020 through the development of the National Guideline for the Use

of Medications During Breastfeeding. Additionally, the Mama Friendly Pharmacy (MFP) project has been initiated by the Ministry of Health of the Republic of Serbia. This project lasted 9 months, from March 2022 to November 2022. The aim of this project was to include community pharmacy in breastfeeding support through SPS. The primary aim of the study was an evaluation of the pharmacists' educational training for breastfeeding support and their perception about its usefulness. The second aim was an evaluation of the provided SPS over four months, with a calculation of theoretical cost savings for counseled families in case of the risk for introduction of CMF. The continuation of breastfeeding instead of starting with CMF was monetized through cost savings analysis, which is based on energy equivalent human milk and CMF, regardless of the differences in health, social and ecology outcomes of breastfeeding.

Participants and methods

We conducted a prospective observational study presented in Fig. 1.

The study was approved by the Ethical Committee of the Pharmaceutical Chamber of Serbia, number 316/5.3, in November 2022.

Training of pharmacists and implementation of structured pharmaceutical care service

In order to calculate the adequate sample size, we used the available calculators. For the population of approximately 6,000–7,000 community pharmacists in Serbia, the sample size was estimated to approximately 360. An online open call was advertised over one month; however, due to the difficulties to organize work activities during two shifts, in the end a total of 256 pharmacists managed to complete the educational training. The community pharmacists voluntarily underwent additional

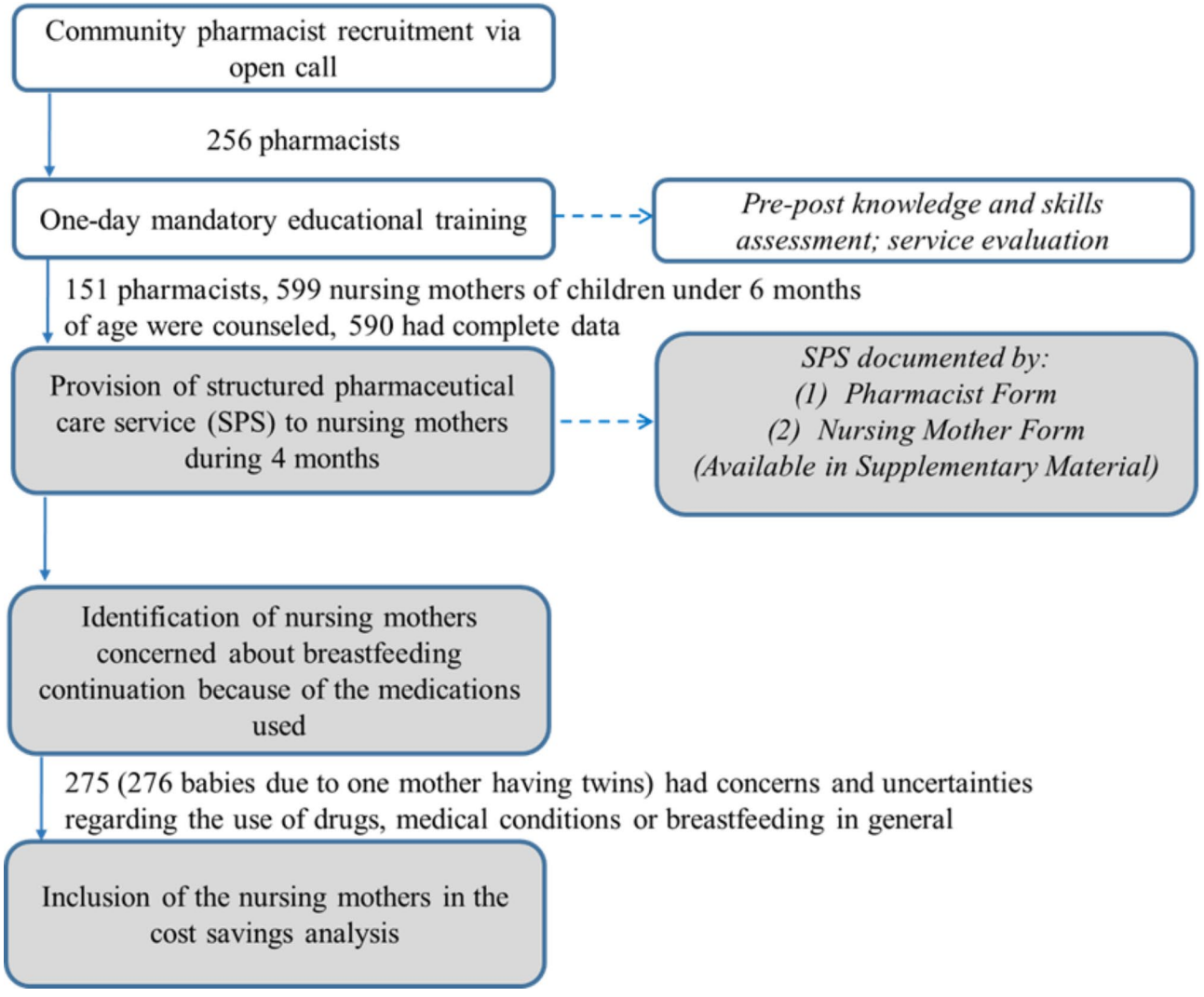

Fig. 1 Study flow chart

education regarding pharmacotherapy management and support during breastfeeding in April and May 2022, in one of the four cities from different regions of Serbia: Belgrade, Novi Sad, Niš, and Kragujevac. In the following four months of the MFP project, trained pharmacists provided SPS to all nursing mothers entering community pharmacies.

The applied inclusion criteria were: a community pharmacist with a license, member of the Pharmaceutical Chamber of Serbia who answered the open call of the Ministry of Health to participate in the MFP, with an educational training in person following SPS. Trained pharmacists were asked to provide and document at least 10 SPS by the end of October 2022. The exclusion criteria applied to pharmacists who did not work as community pharmacists. This study included all nursing mothers visiting the community pharmacy (with trained pharmacist) and willing to participate in the project. The inclusion criteria for nursing mothers for the cost saving analysis were: written consent to receive SPS, and continuation of breastfeeding after provided SPS.

The educational training program tailored for community pharmacists in Serbia contained pharmacotherapy management during lactation period based on the National Guideline and publicly available electronic databases– LactMed, e-lactantia [15, 16]. Educational training activities consisted of 6 h of interactive teaching provided by 4 university professors and 2 clinician specialists, and 2 h of active workshops with the same professors, a specialist, and 3 more pharmacists with more than 10 years of experience in community pharmacy. The training was conducted during one working day as frontal teaching in small groups. The education included theoretical knowledge on medication safety during breastfeeding, practicing skills in database search and use (National Guideline, LactMed, e-lactancia), practicing skills through individual and group activities, exercises and solving clinical cases. The training part included the benefits of breastfeeding, legislative framework of CMF marketing, and pharmacist-led interventions-patient oriented counseling tailored in accordance to patients needs, as tools for breastfeeding support. In addition, the participating pharmacists were asked to approach pre- and post-test assessment of their knowledge and skills.

Implementation of structured pharmaceutical care service (SPS)

The SPS included counseling with or without intervention (medication replacement, introduction of OTC, introduction of non-pharmacological measures).

Structured pharmaceutical care service as part of the MFP consisted of:

1. Introduction of particular pharmaceutical care service for nursing mothers who gave written consent under data protection rules in order to participate in the study;
2. Completion of SPS forms, aiming to enhance structured and uniform service provision, accompanied by data collection for research and practice improvement purposes. Two questionnaires were developed within the MFP project which were used for this research: Community Pharmacist Form and Nursing Mother Form (provided in Supplementary material 1). The Community Pharmacist Form included questions on medications and diseases, identification of drug and/or health problem and risk for breastfeeding cessation, risk classes for prescription or alternative medications offered, counseling topics, recommendations for infant monitoring, and outcomes of follow-up (via telephone or on site). Pharmacist-led interventions and counseling for breastfeeding support were documented in this way. The Nursing Mother Form was developed to collect data regarding demographics, mothers' habits, problems and dilemmas associated with breastfeeding and use of medications during lactation. Both questionnaires were pre-tested by 5 community pharmacists and 8 nursing mothers, and the items were further clarified and revised. The provision of SPS was free of charge to the nursing mothers.

Measurement and outcomes

The knowledge and skills of the trained pharmacists were evaluated with a pre- and post-test consisting of ten questions in the following disciplines: the international code of marketing of CMF, the pharmacokinetic characteristics of a drug and relative infant dose, appropriateness of pharmacist interventions and skills demonstrated in 3 different clinical cases, and rational use and safety of various medications during breastfeeding. The 10 questions for the pre- and post-training test were randomly chosen from a total of 60 questions related to training materials (Supplementary material 2). The training materials, which included clinical cases with explanation of solution, were sent to the participants following on-site education.

Additionally, a 5-point Likert scale was used to express the pharmacists' satisfaction with the conducted training and its perceived usefulness. Considering the second part, trained pharmacists were asked to perform SPS, regarding breastfeeding continuation as the main outcome. Therefore, the number of provided pharmacist-led interventions was recorded and cost savings analysis was performed.

Cost savings analysis for counseled families

Cost savings analysis was performed as a monetization of the SPS outcomes in cases where a risk of breastfeeding cessation was recognized, but breastfeeding was continued after counseling. During SPS, the mothers were asked to express their doubts related to breastfeeding continuation. If the answer was "YES", this was considered to be a risk for cessation. Pharmacist-led interventions were accepted in all cases, except in two nursing mothers who still expressed dilemmas about breastfeeding continuation after counseling with a trained pharmacist. Those two cases were excluded from further analysis. Starting with the assumption that the expressed uncertainty is a potential reason for introducing CMF, we included all the cases in the cost savings calculation. The cost savings analysis was based on the monetization of breastfeeding continuation as the cost of CMF that a child needs until 6 months of age. The calculation was based on the simple financial difference between continuation of breastfeeding until the age of 6 months, which is the duration for exclusive breastfeeding recommended by the WHO [1]. In addition, the expected variation in the price of CMF in the market was taken into account, considering the brand type.

Standard infant CMF from six domestic and international manufacturers/importers were chosen. The CMF price was calculated by increasing the wholesale price by 5–20% of the retail margin and adding the corresponding VAT amount, resulting in the values represented in Supplementary material 3 in local monetary units (RSD), with the National Bank of Serbia exchange rate for EUR on the day of calculation. Supplementary material 3 shows a calculation of the average number of meals that infants would have required until full six months of age.

The three steps of cost calculation were defined:

1. Determine the daily amount of CMF. We calculate the daily intake of each brand for each month of the infant's life until 6 months, based on the recommendation given by manufacturer;
2. The next step was the calculation of the monthly price of CMF intake for an individual infant. To calculate the monthly amount, the cost of daily intake for each month was multiplied by 30;
3. Finally, in order to calculate the cost savings for the counseled families, we take into account the time until the end of the infant's sixth month.

Statistical analysis

Statistical analysis of the training and providing of SPS was conducted using SPSS 27 with statistical significance $p < 0.05$. The changes in the proportion of correct answers given to the questionnaire assessing the pharmacists' knowledge and skills, before and after the education, were tested using the McNemar test. Results of the 5-point Likert scale, used to express the pharmacists' satisfaction and perceived usefulness were presented as mean ± standard deviation. For cost savings, descriptive statistics were used, and the calculation was performed in Microsoft Excel software, version 2016.

Results

Evaluation of community pharmacists' educational training

The results of the pre- and post-educational test, aiming to evaluate knowledge and skills, showed a statistically significant higher level of knowledge related to the use of drugs during breastfeeding after education ($p < 0.05$ for each of the 10 questions). The percentage of correct answers ranged between 43.4% and 75.8% before the educational session, whereas it was 88.5–99.6% after the education.

The highest increase in the proportion of correct answers was observed for the use of antibiotics, hormonal contraception (36.3%) and vitamin intake (55.1%) during breastfeeding ($p < 0.001$). Of all the enrolled participants, 28.1% improved skills regarding appropriate pharmacist-led interventions in clinical cases included in the test.

The estimated level of education indicated by the pharmacists is demonstrated in Fig. 2. The participants showed high satisfaction rates with both the quality and the usefulness of the education (mean ± standard deviation; content value 4.89 ± 0.51, technical value 4.91 ± 0.41, program value 4.96 ± 0.20, and usefulness value 4.94 ± 0.25, out of 5).

Evaluation of implemented structured pharmaceutical care services

The second phase of the study involved the active provision of SPS by a trained pharmacist.

After the training, 151 out of 256 (59%) pharmacists were enrolled in the implementation of SPS. Other pharmacists who had previously finished educational training did not provide SPS due to various barriers (lack of time or place for counseling, lack of nursing mothers in the pharmacy during the project, change in work settings, etc.). Furthermore, within the timeframe of four months, a total of 1,243 services were delivered to nursing mothers. A total of 599 nursing mothers of children under 6 months of age were counseled, while 590 delivered complete data, and 275 (276 babies, due to one mother having twins) had concerns and uncertainties regarding the use of drugs, medical conditions or breastfeeding in general. In three cases of prescription medicines– antibiotics and calcium channel blocker, the nursing mothers had received physician's advice to pause breastfeeding during therapy, while in all the other cases they expressed their own uncertainties regarding the

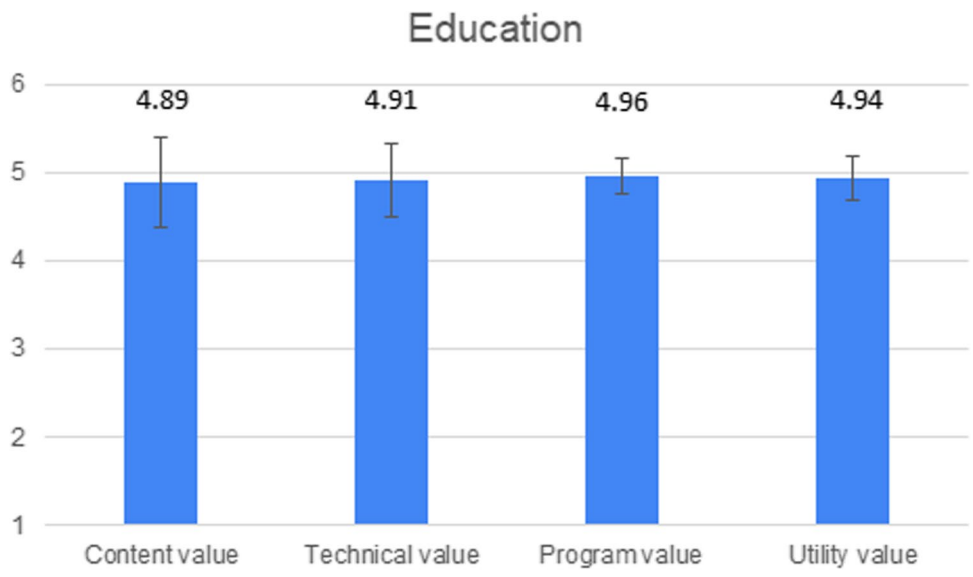

Fig. 2 Estimated level of satisfaction with training indicated by community pharmacists

safety of the child. In none of the recorded cases were the prescription medicines or the illness a contraindication for breastfeeding. Consequently, all the nursing mothers received SPS and were supported to continue breastfeeding with tailored pharmacist-led intervention. Further analysis showed that the highest risk of potential harm was perceived for antibiotic treatment, and it was identified in 65 cases. The number of individual counseling sessions with nursing mothers using non steroid anti-inflammatory drug (NSAID) was 33 (in 7 cases the indication was migraine), antihistaminic 12, with antihypertensive medications 8, and oral hormonal contraception was considered in 7 cases. The identification of symptoms of minor health problems, with indication for OTC, was present in 27 cases. Furthermore, 14 cases of nursing mothers who required counseling regarding dietary supplements based on vitamins of microelements were recorded. In addition to drug administration, specific nursing mothers' health conditions, particularly mastitis (7 cases) and COVID-19 (13 cases), posed a barrier to continued breastfeeding. Interventions related to topical therapy were given in 23 cases, including nasal, dermal, vaginal and rectal administration of chosen drugs. Figure 3 shows the variety of topics in pharmacist-led interventions.

In all the cases, counseling was provided regarding the proper use of medications during lactation and the potential effects of the prescribed therapy on the infant and lactation. In addition, advice on non-pharmacological measures included education on hygiene, recommended nutrition, and lifestyle practices to ensure adequate milk production.

Potential cost savings for counseled families

The range of monetary amounts showed a dependency on the age of infants (expressed in months). Table 1 shows the calculation of cost savings for the counseled families.

The average age of infants whose mothers received SPS was 2.83 months, and the corresponding amount of total savings ranged from 32,338.69 RSD (approximately 276 EUR) to 39,430.91 RSD (approximately 336.5 EUR) (the average value was 35,884.80 RSD or approximately 306 EUR). The average value of daily savings, taking into account the variation in age and CMF price, was 1,196.16 RSD (10.21 EUR). A total average saving of 61,274.55 RSD (522.8 EUR) was observed for 6 months of CMF use. In the case of a one-month-old child, savings in the range of 48,785.48–59,484.00 RSD (416.3–507.5 EUR) could be achieved.

All ranges of the calculated amounts showed cost savings for the family budget in case of breastfeeding continuation, as the main outcome of structured pharmaceutical care service. All values are expressed in RSD, with the current average exchange rate of 117.2 RSD for 1 EUR on the day of analysis.

Discussion

Educational training and implementation of SPS

Breastfeeding is undeniably of exceptional benefit to both the mother and the child [17]. A systematic review demonstrated that prenatal breastfeeding educational activities expand the knowledge related to breastfeeding, with tendency to increase breastfeeding initiation and continuation [18]. However, Lassi et al. showed that healthcare professionals are an important factor in supporting early initiation of breastfeeding, while strictly prenatal

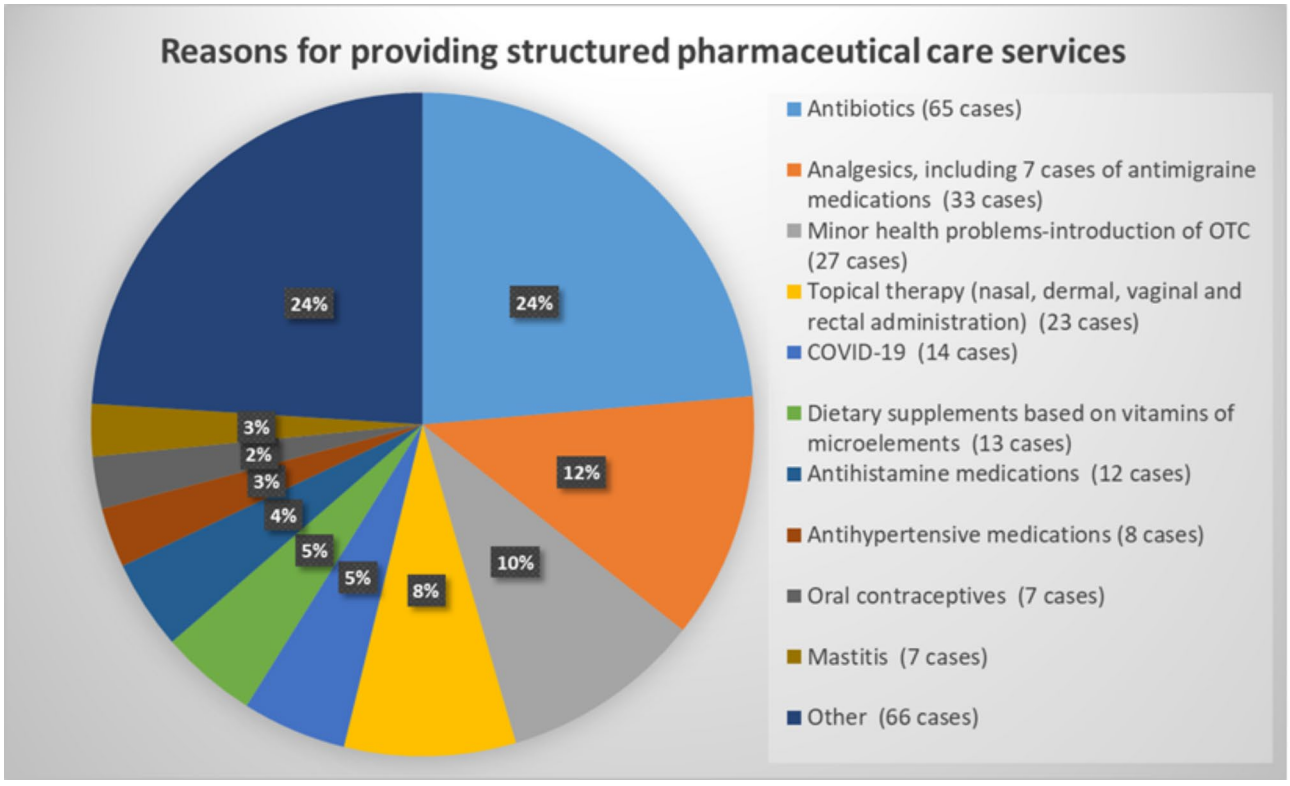

Fig. 3 Variety of topics in pharmacist-led interventions

interventions have no effect [19]. Recently, the Ministry of Health of the Republic of Serbia intensified its activities to promote breastfeeding through the development of the National Guideline for the Use of Medications, followed by the MFP project [10]. The guideline, accompanied by the training provided to community pharmacists, served as a foundation for the implementation of new breastfeeding counseling services– SPS. In our study, the training program showed a positive impact on the knowledge and clinical skills of pharmacists, which is in accordance with Renfew et al., who suggested that multidisciplinary staff training can lead to substantial health benefits and financial savings within various birth weight subpopulations. Besides the positive results of multidisciplinary team support, literature does not offer results regarding the pharmacist's role and effort in breastfeeding support [20]. Over the 4-month duration of the project, 1,243 nursing mothers sought SPS, indicating a 1clear need for counseling and pharmacist support. The World Health Assembly's target aiming to increase the rate of exclusive breastfeeding globally in the first 6 months to 50% by 2025 is achievable, but ambitious [1]. Our results emphasized the importance of breastfeeding support. SPS is necessary in cases of mastitis and COVID-19 in nursing mothers, which are not contraindications for breastfeeding. Rhodes et al. found that adaptation to virtual counseling was higher among counselors than among nursing mothers, who preferred in-person contact, which is the case during SPS in a community pharmacy [21]. Still, to our knowledge, the literature does not offer studies aiming to clarify the influence of pharmacist-led interventions or SPS on the breastfeeding rate and duration.

Cost savings for counseled families

The World Bank Group is supporting the expansion of breastfeeding as a smart and cost-effective investment in the future [22]. Our study monetized potential cost savings based on the price of CMF.

Occupational health is very important and the environmental benefits of breastfeeding are huge. According to a study of the CMF carbon footprint, breastfeeding for six months saves an estimated 95–153 kg CO_2 equivalent per baby compared with formula feeding [23, 24]. The substantial human and economic costs of not breastfeeding in countries with low breastfeeding rates can to some extent be reversed with government, donor and civil society action to increase the financing envelope available for evidence-based high-impact breastfeeding and nutrition interventions and policies [25].

The literature does not offer sufficient studies related to the financial perspective of breastfeeding compared with CMF feeding, but the findings of Rollings et al. suggest the negative effect of marketing of the fast-growing

Table 1 Estimated potential cost savings for the counseled families

Age of infant (months)	0	0.5	1	1.5	2	2.5	3	3.5	4	4.5	5	5.5
CMF usage period (months)	6	5.5	5	4.5	4	3.5	3	2.5	2	1.5	1	0.5
Min cost savings per day (RSD)	1834.04	1730.11	1626.18	1504.29	1382.41	1228.03	1073.65	899.88	726.10	540.22	354.33	177.16
Min cost savings per month (RSD)	55021.24	51903.36	48785.48	45128.81	41472.15	36840.88	32209.60	26996.35	21783.10	16206.48	10629.85	5314.93
Avg cost savings per day (RSD)	2042.49	1923.49	1804.49	1669.06	1533.62	1362.54	1191.45	997.90	804.35	598.59	392.83	196.42
Avg cost savings per month (RSD)	61274.55	57704.65	54134.74	50071.71	46008.68	40876.14	35743.60	29937.10	24130.60	17957.79	11784.98	5892.49
Max cost savings per day (RSD)	2250.93	2116.86	1982.80	1833.82	1684.84	1497.05	1309.25	1095.93	882.60	656.97	431.34	215.67
Max cost savings per month (RSD)	67527.87	63505.93	59484.00	55014.60	50545.20	44911.40	39277.60	32877.85	26478.10	19709.10	12940.10	6470.05

Avg Average, *min* Minimum, *max* Maximum; 117.2 RSD = 1 EUR

CMF industry on the breastfeeding rate in general [26]. That is one of the reasons for further analysis aiming to show the cost savings of breastfeeding continuation. To our knowledge, this is the first cost savings analysis of the SPS influence on the family budget. We believe that SPS may have a positive effect on the continuation of breastfeeding, which can lead to consequently cost savings, especially considering that our country belongs to middle-income countries. In August 2023, the average personal income in Serbia was 86,112 RSD [27]. The median net salary during the study period was 66,401 RSD (566.6 EUR), indicating that 50% of the employed population earned up to this amount. The costs of the average consumer basket increased throughout the year, reaching 99,996.5 RSD (853.2 EUR) in August 2023 [28]. Our analysis showed potential monthly average savings from 11,784.98 (100.6), and total 6-month savings of 61,274.5RSD (522.8 EUR), depending on the time of CMF introduction. Hence, we consider that the cost savings regarding SPS may represent an added value of the pharmacist's effort in the domain of public health. A study by Machoni et al. found that the direct costs of breastfeeding, together with the marginal cost regarding maternal equipment, potential dietary supplementation and the opportunity cost of a few hours of breastfeeding itself per day may be high, particularly to low-income workers [29]. This is linked to a modern way of life, which considers comfort to be a regular part of life costs. These additional costs for numerous products that enable more comfortable breastfeeding, especially during the period of breastfeeding establishment, include all products for the care of breasts and nipples, devices, and special foods that support milk production in the mother's diet. The study of Ball et al. suggests adapting the legal regulations of nursing mothers' right to medicinal and social help, even for mothers from countries with a very high standard of living [30]. Health and economic benefits for both infants and mothers, and associated savings for families, insurers, and society, deserve the support of wider society [30, 31]. However, the literature showed a lack of analyses which quantified the intangible costs of non-breastfeeding, such as the pain and suffering caused by infectious illnesses, and long-term outcomes (diabetes, cognitive development). On the other hand, Rollings emphasized that success in breastfeeding is not the sole responsibility of a woman– the promotion of breastfeeding is a collective social responsibility [26]. In this regard, education has provided an additional value to community pharmacists involved in the provision of SPS, as it has been assessed as highly useful for their daily practice. Through the provision of the SPS, it has been observed that there are often concerns about illness, or simply insecurities regarding the quantity and quality of milk. In all these cases, SPS plays a crucial role in supporting

the continuation of breastfeeding. Regarding the current situation in Serbia, according to the data from the governmental Statistical Office, the number of live births in Serbia from January to December 2022 was 62,250 [32]. The potential cost savings that a family can achieve by breastfeeding continuation may be small, but they are still quantifiable. For example, the savings that would be achieved with counseling for a one-month-old child amount to 48,785.48–59,484.00 RSD (416.2–507.5 EUR). The results by Whelan et al. suggest that financial incentives have been used with varying degrees of success in proactive public health promotion, such as encouraging smoking cessation, including smoking cessation in pregnancy, health screening attendance, and weight loss [33]. There have been very few investigations on using financial incentives to encourage breastfeeding. In Quebec, Canada, nursing mothers received a monthly breastfeeding benefit of 55 Canadian dollars (it is approximately 3,200 RSD or 27.3 EUR) until their infant was one year old [34]. This showed that, even in a country with a significantly higher standard of living than Serbia, that amount was considered to be motivational for nursing mothers. Our results showed almost ten times higher daily savings, which could be significant for the family budget.

In a study of predominantly low-income families in the United States, Anderson et al. showed that nursing mothers who received additional help were significantly more likely to exclusively breastfeed throughout the study compared to controls [35]. In addition, according to the routinely collected data in certain areas of England, offering a financial incentive increased breastfeeding prevalence at 6 to 8 weeks [36]. These studies demonstrated positive results, offering hope that SPS as a source of savings could be an important factor in the decision to continue breastfeeding until 6 months of age or longer, but they did not investigate the role of community pharmacists. The results by Goksen et al. suggest that health promotion and nursing mothers' attitudes about the importance of breastfeeding are not enough to increase the rate and duration of breastfeeding, except with additional acknowledgment of the social, economic, psychological and cultural realities [37]. That highlights the potential role of community pharmacists able to provide tailored SPS in the sensitive field of breastfeeding, with positive outcomes for both public health and the family budget.

Limitations of the study

After training of 256 pharmacists finished a complete training, 151 (59%) provided SPS. Considering voluntary based enrollment, the reasons for not providing the SPS were not required. Considering nursing mother, minimal potential bias should be noted since only mothers willing to communicate were asked to be enrolled. This cost savings calculation was based on the assumption that any interruption of breastfeeding, even for a few days, due to an acute health problem, is a potential breastfeeding cessation. All ranges of the calculated amounts showed theoretical cost savings for the family budget in case of breastfeeding continuation, as the main outcome of structured pharmaceutical care service. We estimated the costs of CMF by the age of six months. These two types of feeding (breastfeeding and CMF) are similar in energy value and composition of the main nutrients, and therefore they were compared financially. This type of analysis did not include material and non-material values of breastfeeding. The study did not include the costs of water, necessary for the preparation of meals, nor the costs of other feeding utensils, the preparation process, and other costs that occur in connection with the infant's nutrition– the use of dietary supplements, vitamins, changes in the consumption of diapers, etc. In continuation, the benefits for the physical, social and cultural development of the infant and health benefits for both the mother and infant were not calculated. Moreover, we did not take into account the lost earnings for pharmacies related to CMF and the pharmacists' time spent on voluntary public health promotional activities. The SPS was provided only to nursing mothers who sought community pharmacist counseling. We followed them for short time, early after counseling, but not for long-term period.

Conclusions

Results showed that counseling provided by community pharmacists have potential to influence breastfeeding continuation and duration. The training of pharmacists, as the most accessible healthcare professionals, adds significant value by enhancing their knowledge and skills necessary for managing pharmacotherapy with a focus on infant safety and the health of nursing mothers. Additionally, potential cost savings could attribute to continuation of breastfeeding.

Future research should include a large number of trained pharmacists and provided SPS, with comprehensive economic evaluation, such as cost-utility analysis.

Supplementary Information

The online version contains supplementary material available at https://doi.org/10.1186/s12913-025-12523-0.

Supplementary Material 1.

Supplementary Material 2.

Supplementary Material 3.

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Authors' contributions
AC, AS, and BM proposed the work's design. SV, LjS, AC, and MK performed the analysis and literature search. AS contributed to the economic analysis and statistics.BM and KM performed the critical appraisal. AC drafted the paper, and all the authors critically revised the manuscript and approved the final version.All authors approved the submitted version. All authors have agreed both to be personally accountable for the author's own contributions and to ensure that questions related to the accuracy or integrity of any part of the work, even ones in which the author was not personally involved, are appropriately investigated, resolved, and the resolution documented in the literature.

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Data availability
All data are available from the corresponding author upon reasonable request.

Declarations

Ethics approval and consent to participate
This study has been approved by the Ethical Committee of the Pharmaceutical Chamber of Serbia, number 316/5.3, in November 2022.
All the participants gave their informed consent to participate.

Consent for publication
Not applicable.

Competing interests
The authors declare no competing interests.

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