Society of Medical Education & Research

2025, Volume 5, Page No: 222-234
ISSN: 3108-4850

Annals of Pharmacy Education, Safety, and Public Health Advocacy

Discrepancies between Pharmacists' Self-Perceived and Actual Knowledge on Contraceptive Safety: Implications for Clinical Practice and Professional Development

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Abstract

Pharmacists frequently serve as the first point of contact for patients seeking medical advice or assistance with health concerns, a role that has become even more prominent after the COVID-19 pandemic. Community pharmacists are expected to have a wide range of knowledge and skills. To facilitate their professional growth, it is important for them to assess their own competencies through self-reflection. The aim of this study is to evaluate pharmacists' clinical knowledge and practices regarding the safe use of contraceptives, compare the results of external assessments with pharmacists' self-evaluations of their knowledge, and explore the impact of preceptorship experiences. Contraceptives were selected as the focus due to the high rates of abortion as a form of contraception in Bosnia and Herzegovina. A survey-based method was used for this study. The survey had three sections: the first included two case scenarios on the safe use of contraceptives to assess clinical knowledge, the second focused on pharmacists' self-assessment of their ability to handle those cases, and the third collected demographic information, including preceptorship experience. The second section also evaluated dispensing practices. The survey was distributed to a sample of 100 pharmacists during the Annual Meeting of Pharmacists in Bosnia and Herzegovina. Results were expressed as percentages, and statistical analyses were conducted using the Mann-Whitney U test to compare preceptors and non-preceptors, the Wilcoxon signed-rank test for paired assessments, and Spearman's correlation to explore associations between variables. A total of 84 out of 100 pharmacists invited to participate completed the survey, yielding an 84% response rate. The results showed a lack of alignment between the pharmacists' actual knowledge (average score for case 2: 3.3, case 1: 2.71) and their self-reported knowledge (average score for case 1: 3.77, case 2: 3.91). While there was no significant difference in actual knowledge between pharmacists with or without preceptorship experience, a notable difference was found in the self-assessment scores between these two groups. In conclusion, pharmacists tend to overestimate their own abilities, resulting in a self-enhancement bias, with preceptorship experience having some impact on this perception. The ability of pharmacists to accurately assess their own clinical knowledge requires further investigation to ensure that they can provide the best possible care to patients.

Keywords: Clinical knowledge, Pharmacist, Case scenario, Self-assessment, Bosnia and Herzegovina, Oral and emergency contraceptives

Introduction

Community pharmacists' roles have expanded, especially following the COVID-19 pandemic, building on their traditional role as the first healthcare professional patients approach for a variety of health concerns [1-3]. Today, community pharmacists are expected to manage multiple medicine-related issues, enhance adherence to treatment, particularly for chronic conditions, improve quality of life, address affordability challenges, and offer suitable solutions and advice [4, 5]. The desire for prompt and accessible care often leads patients to community pharmacies, particularly when physician consultation times are long, and healthcare resources are limited in many regions [6, 7]. Affordability is a critical issue,

Access this article online https://smerpub.com/

Received: 07 August 2025; **Accepted:** 28 November 2025

How to cite this article: Morozova SI, Sidorov AP. Discrepancies between Pharmacists' Self-Perceived and Actual Knowledge on Contraceptive Safety: Implications for Clinical Practice and Professional Development. Ann Pharm Educ Saf Public Health Advocacy. 2025;5:222-34. https://doi.org/10.51847/DtW0yfbGlh

especially in low- and middle-income countries (LMICs), where long-term illnesses can significantly affect families' financial stability [8, 9].

This changing landscape has increased the demand for pharmacists to possess a diverse set of competencies, often overlapping with other healthcare disciplines, to effectively manage these evolving challenges [6]. The competencies required include communication skills, in-depth knowledge of drug therapy, non-drug treatments, complementary medicine, disease management, diagnostic techniques, physical assessments, therapeutic planning, and the ability to critically evaluate drug information [10, 11]. In regions like the Republic of Srpska, this knowledge is supported by easily accessible guidelines for common health conditions [12]. The need for critical evaluation skills became even more pronounced during the COVID-19 crisis due to widespread misinformation about treatments such as hydroxychloroquine, which posed risks of increased mortality and economic strain [13-15]. These evolving demands represent ongoing challenges for healthcare professionals, including community pharmacists [16]. The discipline of pharmaceutical care emerged out of dissatisfaction with earlier practices and the pressing need for better-trained healthcare providers with comprehensive therapeutic knowledge to improve patient outcomes [17].

Enhanced knowledge and skills have been shown to improve patient care, as demonstrated by pharmacists in India successfully managing patients with COPD [18, 19], with similar results in other middle-income nations [20, 21]. Community pharmacists also play a critical role in managing acute respiratory infections, guiding patients through proper treatment, and providing training to other pharmacists [12]. Furthermore, pharmacists have a significant opportunity to lead antibiotic stewardship programs, particularly in countries where antibiotics are still available without prescriptions despite legal prohibitions [22, 23].

Several tools are used to assess pharmacists' professionalism and competencies [24, 25]. Case scenarios, which include clinical situations with multiple-choice questions, are particularly valuable in assessing patient safety aspects [26]. Self-assessment is a key skill in professional development, forming the foundation of continuous professional learning [27, 28]. Through self-assessment, healthcare professionals can manage their own improvement [16, 29]. Self-rating, used to evaluate clinical performance or knowledge, is particularly important for pharmacists [30]. We believe that pharmacy education can be further enhanced by requiring direct measures of students' learning, beyond their knowledge and skills [31]. However, there is limited research on the self-assessment abilities that pharmacists need to improve patient care, which is concerning as healthcare professionals may sometimes overrate their performance [32]. This issue contrasts with physicians, who have been found to struggle with accurate self-assessment [30, 33]. Gaps in pharmacists' expertise may lead to errors and failure to recognize when actions are inappropriate [34]. Interestingly, health professionals who are less confident may be preferred, as they are more likely to verify facts before acting, unlike overconfident individuals [33].

We focused on pharmacists' knowledge of contraception in Bosnia and Herzegovina (B&H), where an estimated 3.9 million girls aged 15 to 19 undergo unsafe abortions each year worldwide [35]. In B&H, a 2010 survey revealed that 28.8% of women had an induced abortion, with abortion being the preferred contraceptive method among married women (88.6%) and secondary school girls (64.5%) [36]. This raises concerns due to the negative mental health impacts, which need to be addressed [36]. Similar trends are observed in other Balkan countries, where abortion rates are high [37]. For instance, Serbia’s abortion rate is double its fertility rate, one of the highest in Europe [38]. The graduate curriculum for pharmacists in the Republic of Srpska currently lacks practice-based training in simulation laboratories, though there is a mandatory internship where students apply their knowledge in real settings. This internship includes 300 days in a community pharmacy, 30 days in a drug control laboratory, and 35 days in a hospital pharmacy, under the supervision of experienced preceptors [39]. A similar structure exists in the Federation of Bosnia and Herzegovina.

Pharmacists play a critical role in sexual and reproductive health (SRH), particularly in providing access to contraceptive methods [40]. Reducing barriers to SRH does not necessarily encourage risky sexual behaviors [40]. In B&H, oral and emergency contraceptives are the most dispensed forms of contraception in pharmacies, while intrauterine devices and long-acting injections are typically administered in hospitals [41]. Mifepristone/misoprostol, vaginal rings, and implants are not registered in B&H [41]. Ulipristal acetate is available as an over-the-counter emergency contraceptive, with no age restrictions on dispensing [41]. However, there are

concerns about the competence of pharmacists in providing SRH services, which necessitates appropriate knowledge and training [42, 43].

The objectives of this study were to assess pharmacists' clinical knowledge and practices related to the safe use of contraceptives, compare pharmacists' self-assessments with external evaluations, and examine the role of preceptorship experience in enhancing professional competence. The findings can contribute to improving family planning services in B&H and beyond, and provide insight into the self-assessment skills needed by pharmacists, an area that has limited research. In this study, self-assessment is defined as the ability to accurately predict one's knowledge in comparison to an objective standard.

Materials and Methods

Study design

A cross-sectional survey targeting pharmacists was carried out in Bosnia and Herzegovina (B&H), a country comprising two entities—the Republic of Srpska and the Federation of B&H—along with the separate Brčko District of B&H. Each entity, together with the Brčko District, independently manages its own healthcare and education systems. The survey took place on 21 February 2020. The two clinical case scenarios, along with their associated questions, were developed between December 2019 and February 2020.

The questionnaire was specifically constructed to meet the study objectives and employed a qualitative approach known as the nominal group technique (NGT). The NGT is a rigorously structured, face-to-face group discussion method that promotes equal participation by ensuring all voices are heard and opinions are valued by peers; it is commonly applied in research settings [44-48].

Three NGT sessions were held: two homogeneous and one heterogeneous. The first homogeneous session involved four clinical pharmacologists, while the second included three experienced researchers in pharmacy practice. A subsequent heterogeneous session—comprising two pharmacists, one psychologist who is also a qualified pharmacist, and two gynecologists—was conducted to validate findings from the earlier sessions. These small group sizes facilitated maximum and in-depth input from every participant. Moreover, the three sessions were considered sufficient as no new themes emerged after the third, consistent with approaches in similar studies [49, 50].

The NGT sessions were held in January 2020 at the University of Banja Luka and the University of Belgrade, with each lasting approximately two hours. All sessions followed the four standard NGT phases: silent idea generation, round-robin sharing, clarification, and voting (ranking or rating). Participants received a draft questionnaire in advance, informed by existing literature [51].

The aggregated ranks from the two homogeneous sessions were used to prioritise and refine the most valued ideas. Once the questionnaire was finalised based on participant feedback, it was emailed to members of the heterogeneous NGT group. Their task was to suggest any potentially overlooked ideas and to rank (from 1 = least important to 10 = most important) the proposed statements for the first domain of each case scenario.

Subsequently, the questionnaire underwent independent pretesting for clarity, precision, and comprehensibility by five pharmacists unaffiliated with the research team, who were recruited through snowball sampling [52]. After completion, each of these pharmacists participated in a short interview with the principal investigator to discuss their feedback. Final revisions were then incorporated based on their comments.

The final questionnaire consisted of three domains. The first domain featured two practical case scenarios. Case 1 was designed to evaluate pharmacists' knowledge and attitudes regarding the identification of potential adverse drug reactions associated with oral contraceptives. Case 2 aimed to assess the appropriateness of dispensing emergency contraceptive pills (ECPs) along with the provision of suitable counselling. In both scenarios, the focus was on determining whether pharmacists offered appropriate guidance on the safe use of oral and emergency contraceptives. Further details of the scenarios are provided in **Table 1.**

For each case, pharmacists selected the single response they considered correct for each statement (9–10 statements per case, with 2–3 response options each). The final paragraph of each case was open-ended, allowing pharmacists to provide additional patient advice in their own words. Knowledge scores for each case were calculated as the sum of points assigned to individual statements, with point values determined during the NGT sessions based on clinical importance.

The second domain collected data on pharmacists' self-assessed knowledge related to the presented cases (from the first domain) as well as their routine dispensing practices for oral and emergency contraceptives. The

third domain gathered demographic information and details about the pharmacists' professional experience.

Table 1. Patient case scenarios

Case Scenario 1	Case Scenario 2
26-year-old female	16-year-old female
Preparing for a trip to the USA in two days	Had unprotected sexual intercourse 4 nights ago
Experiencing unexplained swelling and severe pain in the calf of one leg	In a long-term relationship; uses withdrawal method as contraception
Suffers from a morning headache	Has never visited a gynecologist
No history of leg injury or chronic health conditions	From a religious family
Smokes	Smokes
Regularly takes combined oral contraceptives (COC)	

[a]*COC* combined oral contraceptive

The pharmacists' level of knowledge and their self-assessment for each case scenario were rated on a scale from unsatisfactory to very good. The knowledge scores were provided by an external evaluator (A.G.J.), based on a system developed during the Nominal Group Technique (NGT) sessions. The full scoring details can be requested from the corresponding author (A.G.J.).

Data collection and sampling

A convenience sample of 100 pharmacists was selected from the 1090 registered members of the Pharmaceutical Chamber of the Republic of Srpska. These pharmacists completed the questionnaires during the Annual Pharmacists' Meeting in Bosnia and Herzegovina. All questionnaires were handed out at the same time by the researchers in a single conference hall, giving each participant 45 minutes to fill them out. They were instructed to complete the surveys independently without discussing them with others. The sample size of 100 was considered adequate as there were no prior studies to determine a specific sample size for this research.

Statistical analysis

The results were presented as frequencies (%). To compare the two groups (preceptors and non-preceptors), the Mann-Whitney U test was used, while paired data were evaluated with the Wilcoxon signed-rank test. Spearman's correlation was employed to examine relationships between variables. A p-value of less than 0.05 was considered statistically significant. The data were analyzed using SPSS 20.0 (IBM Corp. Released 2011. Version 20.0. Armonk, IBM SPSS Statistics for Windows, NY: IBM Corp).

Results and Discussion

Out of the 100 pharmacists invited, 84 completed the questionnaire, leading to a response rate of 84%.

Demographic information of dispensing and pharmacists habits

The majority of respondents (over 90%) were women, and most were aged between 25 and 35 years. A large proportion of the pharmacists worked in community pharmacies, with experience as preceptors and in managerial positions, though none had worked outside of community pharmacy settings **(Table 2).** Of the 84 pharmacists who participated, almost 90% reported dispensing at least two prescriptions for oral contraceptives each month. In contrast, 41% dispensed two or more prescriptions for emergency contraception monthly. Additionally, 85% of pharmacists stated they would refuse to provide emergency contraception if the patient was under 18 years old, such as a 16-year-old girl.

Table 2. Demographics and dispensing practices of pharmacists

Category	Response
Gender	
Female	76 (95.0%)
Age	
<25	0
25–35	54 (65.1%)
36–45	21 (25.3%)
46–55	5 (6.0%)

>56	3 (3.6%)
Average Dispensing of Emergency Contraceptives per Month	
0–1	46 (59.0%)
2–10	30 (38.5%)
>10	2 (2.3%)
Average Dispensing of Oral Contraceptives per Month	
0–1	8 (10.3%)
2–10	46 (59.0%)
>10	24 (30.8%)
Years of Experience	
1–5	35 (43.2%)
6–10	30 (37.0%)
11–20	10 (12.3%)
>20	6 (7.4%)
Work in	
Hospital pharmacy	1 (1.3%)
Community pharmacy	75 (96.2%)
Other	2 (2.6%)
Preceptor Experience	
Experience as a Manager	44 (54.3%)
Experience as a Preceptor (Mentor)	49 (61.3%)
<5	36 (75%)
6–10	8 (16.7%)
11–20	3 (6.3%)
>20	1 (2.1%)
Previous Experience	
Production	1 (1.3%)
Pharmacy	59 (77.6%)
Marketing	4 (5.3%)
Other	12 (15.8%)

Pharmacists' actual knowledge on the case scenario

In case 1, 69% of pharmacists scored low (unsatisfactory, not good enough, or average) in their understanding of oral contraceptives. In contrast, 56% of pharmacists displayed strong or excellent knowledge about the proper use of emergency contraceptives (case 2). Refer to **Table 3** for details.

Table 3. Pharmacists' knowledge (Actual scores)

Case Scenario	Response
Case Scenario 1	
Not good enough	23 (27.4%)
Good	13 (15.5%)
Unsatisfactory	20 (23.8%)
Average	15 (17.9%)
Very good	13 (15.5%)
Case Scenario 2	
Not good enough	7 (8.3%)
Good	3 (3.6%)

Unsatisfactory	29 (34.5%)
Average	1 (1.2%)
Very good	44 (52.4%)

1. Results are presented as count (%)

Consistency between pharmacists' actual knowledge and self-rating

For case 1, there was no correlation between the pharmacists' actual knowledge and their self-assessments (Spearman's Rho = -0.066, p = 0.557). Despite this, a statistically significant difference was observed (Wilcoxon Signed Ranks test Z = -5.326, p < 0.001). As illustrated in **Figure 1**, self-assessment scores were consistently higher than the actual knowledge scores.

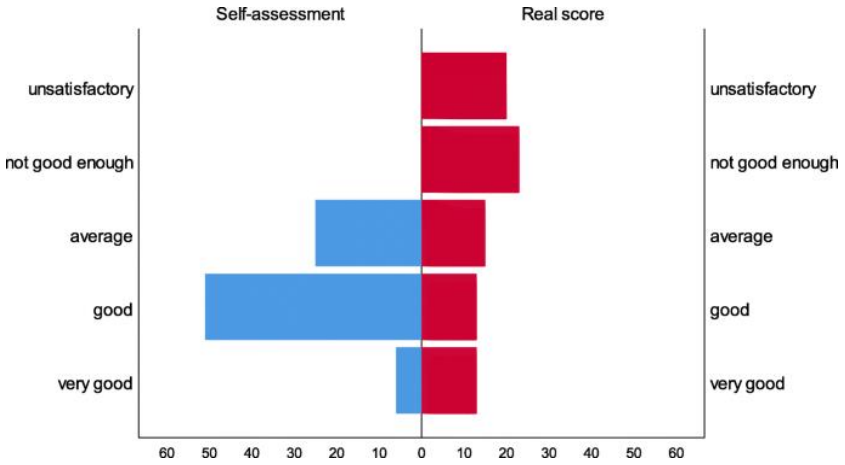

Figure 1. Comparison of pharmacists' perceived knowledge and objectively assessed knowledge for Case 1

For case scenario 2, a positive relationship was identified between pharmacists' objectively measured knowledge and their self-rated competence (Spearman's Rho = 0.317, p = 0.004). Despite this association, the discrepancy between the two assessments was statistically significant (Wilcoxon Signed Ranks test Z = −3.857, p < 0.001). As illustrated in **Figure 2**, pharmacists consistently rated their own knowledge higher than their actual performance in this scenario as well.

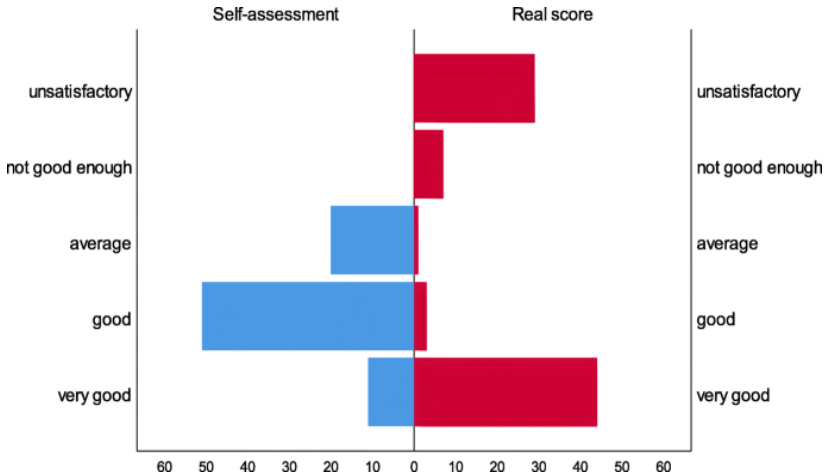

Figure 2. Comparison between pharmacists' self-perceived competence and objectively measured knowledge for Case 2

Comparison of knowledge and self-evaluation between preceptors and non-preceptors

Teaching experience as a preceptor did not result in statistically significant differences in either actual knowledge scores or self-assessed knowledge for case scenarios 1 and 2. Among pharmacists serving as preceptors, more than half demonstrated inadequate knowledge levels (classified as unsatisfactory or below acceptable) for case 1, and 38.8% showed similarly low performance in case 2. In comparison, 48.4% of pharmacists without preceptor experience scored within the unsatisfactory or not good enough categories for both case scenarios. Detailed results are presented in **Table 4.**

Table 4. Comparison of objectively assessed knowledge and self-rated competence between preceptors and non-preceptors

	Preceptorship experience		p value[a]
	Yes	**No**	
Case Scenario 2 – Actual Knowledge			**0.370**
Excellent	27 (55.1%)	15 (48.4%)	
Good	2 (4.1%)	1 (3.2%)	
Very poor	14 (28.6%)	13 (41.9%)	
Below acceptable	5 (10.2%)	2 (6.5%)	
Moderate	1 (2.0%)	0 (0%)	
Case Scenario 1 – Actual Knowledge			**0.413**
Excellent	8 (16.3%)	5 (16.1%)	
Good	6 (12.2%)	6 (19.4%)	
Very poor	14 (28.6%)	5 (16.1%)	
Below acceptable	12 (24.5%)	10 (32.3%)	
Moderate	9 (18.4%)	5 (16.1%)	
Self-Rated Knowledge – Case Scenario 2			**0.041**
Excellent	8 (16.7%)	3 (9.7%)	
Good	33 (68.8%)	17 (54.8%)	
Below acceptable	0 (0%)	0 (0%)	
Very poor	0 (0%)	0 (0%)	
Moderate	7 (14.6%)	11 (35.5%)	
Self-Rated Knowledge – Case Scenario 1			**0.099**
Excellent	4 (8.3%)	2 (6.5%)	
Good	33 (68.8%)	16 (51.6%)	
Very poor	0 (0%)	0 (0%)	
Below acceptable	0 (0%)	0 (0%)	
Moderate	11 (22.9%)	13 (41.9%)	

[a]Mann - Whitney U test

Despite the absence of differences in objectively measured knowledge, self-evaluated competence differed significantly between pharmacists with and without preceptor experience. For case scenario 1, 77.1% of preceptors rated their knowledge as good or excellent, compared with 58.1% of pharmacists who were not involved in precepting. In case scenario 2, both groups reported even higher self-assessment scores, as shown in **Table 4.**

To our knowledge, this is the first study conducted in the Balkan region—and possibly beyond—that integrates externally assessed pharmacist knowledge with self-perceived competence, while also examining the potential influence of preceptorship experience. Based on our results, we suggest that structured, knowledge-based evaluation methods, such as objective examinations similar to those applied in this study, are particularly valuable for accurately measuring pharmacists' competencies in specific clinical domains. Traditional

knowledge assessment through written examinations, including multiple-choice formats, is well established in the literature [53]. However, relying solely on paper-based tests presents limitations when attempting to comprehensively evaluate clinical knowledge. For this reason, we consider externally evaluated, objective knowledge assessments to be a sustainable and essential approach for future competency evaluation. In the present study, two assessment methods developed through the Nominal Group Technique (NGT) were applied: an external objective evaluation using two case scenarios and a self-assessment component. This dual approach was chosen to better understand real-world practice, especially given the potential gap between actual knowledge and professional behavior.

A key concern arising from our findings is the insufficient level of clinical knowledge among pharmacists regarding the safe use of contraceptives. This observation aligns with the conclusions of Koračević *et al*., who reported limited recognition of drug-related problems among community pharmacists in Balkan countries, potentially stemming from insufficient clinical focus during pharmacy education [6]. As a result, continuous post-qualification education aimed at improving both knowledge and clinical skills is critical to support a proactive, patient-centered model of care. Similar concerns were reported by Stojkov *et al*. in Serbia, where pharmacists demonstrated low competency scores in areas such as diagnosis of minor ailments and patient counseling [16]. Additionally, a Serbian study found that approximately half of pharmacists had poor knowledge of emergency contraception [38]. Notably, our study also revealed that increased professional experience, including preceptorship roles, did not correspond with improved clinical knowledge in this area. This contrasts with findings from Croatia, where pharmaceutical care competencies increased over time [54], as well as studies in medical education showing improved competencies as physicians progress in their careers [33]. It should be noted, however, that most participants in our study were between 25 and 35 years of age.

In Bosnia and Herzegovina (B & H), continuing education (CE) is mandatory for license renewal, with pharmacists required to accumulate a defined number of credits over a five-year cycle. CE programs aim to update pharmacists on various professional topics. Nevertheless, our results, together with existing literature, indicate that professional bodies in B & H should prioritize the development of comprehensive reproductive and sexual health (SRH) education programs covering contraception, emergency contraception, and medical abortion. These programs should be offered both online and in person to meaningfully enhance pharmacists' knowledge in this field [36, 37]. Given that pharmacies are recognized as accessible and convenient points for SRH services, it is essential that pharmacy staff receive clear guidance and standardized protocols to support the delivery of SRH interventions [40].

Our data also highlight a notably low level of contraceptive dispensing in B & H, with nearly 60% of pharmacists reporting that they dispense only two to ten oral contraceptives per month. This finding points to broader systemic challenges, including insufficient institutional and professional support for SRH services among policymakers, medical professionals, and pharmacy organizations in B & H. Addressing this issue is essential to reduce reliance on medical abortion. A comparable situation has been described in Serbia, where Milosavljević reported that approximately half of surveyed gynecologists expressed ethical or moral objections to certain contraceptive methods and therefore did not offer them to patients [38].

Another significant issue identified in our study is that the majority of pharmacists (85%) would refuse to provide emergency contraceptive pills (ECPs) to minors. Gonsalves *et al*. reported similar reservations among pharmacists, largely driven by concerns regarding the safety of SRH interventions for adolescents or doubts about their ability to use these products correctly [40]. Additional concerns include fears that increased access to ECPs may promote risky sexual behavior among young people [40]. These concerns are particularly problematic given the high rates of abortion in B & H and the global prevalence of unsafe abortions [35, 36]. Since ECPs are available directly from pharmacies in B & H, it is crucial to implement targeted pharmacist training and develop streamlined protocols that facilitate access rather than create barriers—especially for adolescents. Encouraging the appropriate use of ulipristal acetate is particularly important, as strong support from regulatory authorities can maximize its potential to reduce unintended pregnancies [55]. The development of national ECP guidelines in B & H could draw on existing protocols from other countries and align with standards already established for other health conditions within the country [12, 56]. Until such guidelines are formalized, pharmacists should rely on the Summary of Product

Characteristics (SmPC), the national Register of Medicines, and internal pharmacy procedures where available. Under current regulations, ulipristal acetate is registered as a non-prescription medicine in B & H, whereas levonorgestrel remains prescription-only.

Our findings further demonstrate that pharmacists frequently lack accurate insight into their own competencies and tend to overestimate their knowledge. Similar patterns have been documented among pharmacists, pharmacy students, and other healthcare professionals, with individuals achieving the highest objective scores often underestimating their performance **(Figure 2)** [53, 57]. Physicians have also been shown to struggle with accurate self-assessment of clinical competence [30]. Moreover, previous research has indicated that pharmacy preceptors may overrate their teaching abilities compared with students' evaluations of their actual performance [58]. This discrepancy has important implications for improving the quality of pharmaceutical care delivered to patients.

Overall, greater emphasis should be placed on objective, knowledge-based evaluations rather than subjective self-assessments when measuring lifelong learning outcomes in pharmacy practice. Continuous development of clinical knowledge and skills is essential for delivering patient-centered care [6, 12, 30]. The integration of clinical pharmacy services into routine practice has been shown to improve both therapeutic outcomes and cost-effectiveness, benefiting patients, healthcare systems, and other stakeholders [18, 19, 59]. Building on this evidence, future efforts in B & H will focus on strengthening pharmacists' roles in contraceptive provision to reduce unintended pregnancies and abortions and to improve patient care more broadly.

Finally, this study highlights the limited available data on pharmacists' and physicians' knowledge and attitudes toward women's reproductive health in B & H, in contrast to Serbia where such issues have been explored [38]. Our results also revealed deficiencies in pharmacists' ability to recognize symptoms suggestive of thrombosis in female patients, which is particularly concerning. This underscores the urgent need for enhanced CE initiatives, especially during public health crises such as pandemics, when misinformation is widespread and pharmacists play a critical role in patient education and guidance [1-3, 14, 15]. This is especially relevant given emerging evidence that SARS-CoV-2 infection may increase the risk of thromboembolic events associated with combined hormonal contraceptives and other estrogen-based therapies [60-62]. We believe that our findings and their implications will be relevant to other countries seeking to reduce unintended pregnancies and unsafe abortions.

As with any research, this study has both strengths and limitations. Key strengths include drawing attention to the need for enhanced pharmacist education in SRH and introducing a novel, objective, and practical assessment approach. The assessment methods applied in this study remain underexplored in the existing literature among pharmacists and other healthcare professionals, and they show promise for adaptation to other clinical areas and performance evaluations in community pharmacy practice. The use of NGT to develop the case scenarios represents an additional methodological strength. Limitations include the lack of formal statistical validation of the questionnaire and the relatively young age profile of the sample, with most participants aged between 25 and 35 years.

Conclusion

The findings of this study indicate that community pharmacists in Bosnia and Herzegovina demonstrate inadequate clinical knowledge related to the safe use of both oral and emergency contraceptives. This shortcoming is particularly concerning in the context of the persistently high abortion rates observed across the Balkan region, combined with limited and inconsistent sexual and reproductive health (SRH) initiatives among healthcare professionals. Together, these factors pose a risk to the health and well-being of women and families in the region.

We expect that pharmacists' competence in this area will improve with the introduction of updated undergraduate pharmacy curricula that place greater emphasis on clinical pharmacy and pharmacy practice, including targeted education on contraception and emergency contraception. Future research should evaluate the effectiveness of these curricular changes, as well as continuing education (CE) programs for practicing pharmacists, in enhancing professional competence related to contraceptive counseling and safe use in Bosnia and Herzegovina. Evidence generated from such studies may also serve as a reference for other countries facing similar challenges. Community pharmacists are well positioned to contribute meaningfully to SRH services; however, this potential can only be realized through

appropriate education, structured training, and ongoing professional development.

In addition, the tendency toward self-enhancement or self-assessment bias—where pharmacists overestimate their own knowledge and fail to recognize existing gaps—warrants further investigation. Understanding this phenomenon is important not only for improving individual professional practice but also for strengthening pharmaceutical care more broadly. This issue will be explored in greater depth in future research initiatives.

All authors reviewed and approved the final version of the manuscript. Each author accepts individual responsibility for their contributions and confirms that any concerns related to the accuracy or integrity of the work have been properly examined, addressed, and documented in the scientific record.

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