Macedonian Pharmaceutical Bulletin, 72 (Suppl 1) 511 - 512 (2026)
Online ISSN: 1857-8969
DOI: 10.33320/maced.pharm.bull.2026.72.03.246
Short communication

Assessment of educational needs among hospital pharmacists on biologic medicines

Marija Trajchuleski[1,2*], Elona Chilku[1,2], Darinka Gjorgieva Ackova[1], Katarina Smilkov[1]

[1]*Division of Pharmacy, Faculty of Medical Sciences, Goce Delcev University, Stip, North Macedonia*
[2]*Agency for Medicines and Medical Devices, 1000 Skopje, North Macedonia*

Introduction

While biological medicines currently account for more than 40% of total pharmaceutical expenditure in the EU, compared to 28% in 2014 (IQVIA, 2026), their integration is not seamless; despite decades of established clinical experience with biological therapies particularly biosimilars, remains challenging.

Pharmacists play a critical role in the utilization of these complex medicines, specifically through their involvement in the dispensing process and the monitoring of patients. Knowledge among pharmacists is essential for identifying educational gaps and successfully integrating these medicines into healthcare system.

Ensuring that pharmacists possess adequate knowledge and tailored education is a top priority within healthcare infrastructure. Accordingly, the aim of this research was to assess pharmacists' knowledge regarding biological medicines and to determine their attitudes regarding the specific needs for further professional education in this field.

Materials and methods

In order to evaluate pharmacists' attitudes and knowledge regarding biologicals, a survey was conducted among hospital pharmacists after receiving consent from the Ethics Committee of the Faculty of Medical Sciences at Goce Delcev University in Stip, North Macedonia. The survey was conducted among pharmacists employed in secondary and tertiary healthcare institutions who are involved in managing patients receiving biological therapy, and/or are responsible for dispensing and procurement of biological medicines. Prior the study, a written informed consent was obtained from all participants.

The survey included questions designed to evaluate participants' self-assessed knowledge, objectively measured knowledge, and the perceived need for additional education.

The research data were analysed using the SPSS software package, version 26.0 for Windows. Descriptive statistics were used to express categorical variables as frequencies and percentages, and direct comparisons were made, based strictly on percentage variances.

Results and discussion

A total of 37 surveys were retrieved from pharmacists employed in secondary and tertiary healthcare settings throughout North Macedonia. The highest proportion of respondents 37.84% (14) had more than 20 years of work experience.

*marija.311118@student.ugd.edu.mk

A high proportion of the respondents, 97% (36) reported familiarity with biological medicines, of whom 81% (30) indicating basic knowledge and 16% (6) stating that they possess comprehensive knowledge. Only 3% (1) of the participants reported having heard of this group of medicines but were unable to define them.

Data analysis revealed a clear discrepancy between pharmacists' measured knowledge, and their self-assessed knowledge. For instance, when asked whether substitution of a reference biological medicine with a biosimilar is identical to generic substitution, only 10 (27%) of respondents gave the correct answer. Similarly, regarding the question on the structural characteristics of biosimilar medicines and their degree of similarity to the reference product, only 8 (21%) of respondents provided the correct answer.

A large proportion of pharmacists 94.59% (35), expressed a clear need for additional education on biological medicines/biosimilars. Only two pharmacists (5.41%) considered themselves sufficiently educated on this topic. These findings underscore a strong consensus among the surveyed pharmacists that access to targeted training and continuous education in this topic directly impacts their level of competence. Consequently, the attitudes of the surveyed pharmacists clearly indicate that education and access to reliable information are critical drivers for improving safe and effective utilization of biological therapies. The obtained results are consistent with the findings from studies conducted in other countries. A study conducted by Ling et al. in 2025 in the USA showed that 35.4% of the surveyed pharmacists reported that they were well familiar with biosimilars. Even though 42 (42%) pharmacists understood regulations of interchangeability and substitution, many of the respondents indicated a distinct need for targeted educational programs to facilitate the successful adoption and clinical use of biosimilar medicines. Some European studies (Barbier et al., 2021) showed that approximately 35% of pharmacists were insufficiently trained to regarding treatment with biosimilar medicines, which was significantly higher compared to their self-assessed competence in counseling patients on biological therapy in general.

The data collected in this study, supported by the results from other studies performed earlier, unequivocally demonstrate deficit in specialized professional education and training for pharmacy practitioners on biologicals. There is a demonstrable need to implement targeted educational programs designed to elevate pharmacists' confidence levels in biological therapy. The implementation of these programs is vital for the correct administration, safe monitoring, and comprehensive patient support regarding biologic therapies.

Conclusion

This research demonstrated that hospital pharmacists in North Macedonia need additional education on biologics and self-recognize the need of expanding their continuous education related to this topic, in line with the great advancement that this field of therapeutics has experienced in the recent decades. Enhanced education on biologics, and greater inclusion of hospital pharmacists in managing biologics therapies, can improve clinical workflow, optimize patient safety outcomes, and enhance longitudinal patient monitoring and documentation.

Evidence from multiple countries also underscore that this is a global issue, that requires international response rather isolated regional efforts.

References

Barbier, L. et al., 2021. Knowledge and perception of biosimilars in ambulatory care: a survey among Belgian community pharmacists and physicians. J. Pharm. Policy Pract. 14, 53. https://doi.org/10.1186/s40545-021-00330-x

IQVIA, 2026. The Impact of Biosimilar Competition in Europe. IQVIA Institute for Human Data Science. https://www.iqvia.com/-/media/iqvia/pdfs/library/white-papers/2026/iqvia-the-impact-of-biosimilar-competition-in-europe-2026-01-26-forweb.pdf Accessed 25 May 2026

Ling, Y.L. et al., 2025. Real-world familiarity with US biosimilar regulatory guidelines and interchangeability state laws among pharmacists and physicians treating immunological disorders. J. Manag. Care Spec. Pharm. 31, 552–564. https://doi.org/10.18553/jmcp.2025.31.6.552