Review

by

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of the dissertation by Denitsa Ivanova Dimitrova entitled 'Knowledge, Attitudes and Practices Related to Antimicrobial Resistance in Dermatological Care', submitted for the award of the educational and scientific degree of *Doctor (PhD)* in professional field 7.4 Public Health, doctoral programme in Public Health Management.

By a decision of the Faculty Council of the Faculty of Public Health at Medical University – Varna, recorded in Minutes No. 266/23.09.26, and by Order No. P-109-322/30.09.2026 of the Rector of Medical University – Varna, I was elected a member of the scientific jury. Pursuant to Minutes No. 1/13.10.2026, I was appointed an official reviewer in the procedure for the award of the educational and scientific degree of *Doctor (PhD)* to Denitsa Ivanova Dimitrova, a full-time doctoral student in the Public Health Management doctoral programme at the Department of Social Medicine and Health Care Organisation, Faculty of Public Health, Medical University 'Prof. Dr. Paraskev Stoyanov' – Varna.

The submitted set of documents complies with the requirements of the Act on the Development of Academic Staff in the Republic of Bulgaria, the Regulations for its Implementation and the Regulations on the Development of Academic Staff at Medical University – Varna.

Career Development of the Doctoral Candidate

Denitsa Dimitrova obtained a bachelor's degree in Kinesitherapy from 'Angel Kanchev' University of Ruse in 2004 and a master's degree in the same subject in 2005. Between 2011 and 2014, she studied at Medical University 'Prof. Dr. Paraskev Stoyanov' – Varna, where she obtained a Professional Bachelor's degree in the Medical Cosmetician programme. In 2023, she enrolled as a full-time doctoral student in the Public Health Management doctoral programme at the Department of Social Medicine and Health Care Organisation, Medical University – Varna, with a dissertation entitled 'Knowledge, Attitudes and Practices Related to Antimicrobial Resistance in Dermatological Care'.

Her professional career began at 'Medica-Albena' Medical Centre EAD, after which she worked as a kinesitherapist and beautician in various organisations in the health care and service sectors. Since 2012, she has managed her own beauty centre in Varna. Since 2014, she has held the position of Practical Training Instructor at Medical College – Varna, part of Medical University 'Prof. Dr. Paraskev Stoyanov' – Varna, where she supervises practical classes and pre-graduation placements and actively contributes to the development and updating of curricula and teaching materials.

To enhance her professional and academic qualifications, she has completed a range of specialised training courses in university teaching, interactive teaching methods, research design and statistical analysis, as well as further training to develop her pedagogical competence.

She participates as a researcher and administrative and financial officer in a research project on the subject of her dissertation.

She is proficient in Russian and English.

Relevance of the Topic

Antimicrobial resistance (AMR) is one of the most serious challenges facing modern health care and poses a growing threat to public health worldwide. Self-medication, inappropriate drug selection, unsuitable treatment duration and the reuse of medication left over from previous courses of treatment further increase the risk of AMR. Current research shows that theoretical knowledge of antimicrobial resistance is not always sufficient to ensure appropriate behaviour. Despite the high level of awareness among health care professionals, gaps remain in their understanding of the mechanisms underlying the development and spread of resistance.

Bulgaria lacks comprehensive studies that jointly examine knowledge, attitudes and practices relating to antibiotic use for skin conditions, infection prevention and control in beauty practices, and the containment of AMR. The relevance of the dissertation stems from the growing global and national importance of antimicrobial resistance, the widespread use of antimicrobial agents to treat dermatological conditions, the associated therapeutic difficulties, increased morbidity and mortality, prolonged hospital stays, and the need to improve health literacy and professional competence. Research employing contemporary methods is therefore timely and represents a scientifically well-founded necessity for our country.

Structure, Characteristics and Assessment of the Dissertation

The submitted dissertation comprises 165 pages in total, including a literature review of 50 pages; the aim, objectives, research hypotheses, materials and methods, 11 pages; results of the original studies, 34 pages; discussion and synthesis of the results and conclusions, 25 pages; and the conclusion, recommendations and contributions, 7 pages. The dissertation is illustrated with 8 tables and 26 figures and includes two appendices. The bibliography contains 188 references in the Latin script.

In the **literature review**, the author examines antimicrobial resistance as a global and national threat. The use of antibiotics without a prescription remains widespread, particularly in southern and eastern Europe, where controls on their sale have not been sufficiently effective. Self-medication, unnecessary antibiotic prescribing, environmental contamination with wastewater from hospitals and pharmaceutical manufacturing containing antibiotic residues and resistant microorganisms, and the slow pace of development of new antibiotic molecules create further conditions for the emergence of resistant strains.

The review examines global initiatives and recommendations for action to address the problem, as well as its significance as a major challenge for the health care system in Bulgaria. Particular attention is paid to skin care, common dermatological conditions such as acne vulgaris, cross-infection in beauty salons, and the risks of bacterial, fungal and viral infections, including hepatitis B and C, associated with procedures that breach the skin barrier. The working environment in beauty salons and close contact between practitioners and clients may also facilitate the transmission of respiratory infections spread through droplets, such as influenza, parainfluenza and COVID-19.

Appropriate attention is given to international requirements concerning the safety of the services provided and to recommendations for infection prevention and control in beauty salons. Regulating the ineffective use of antimicrobial agents, including not only antibiotics for systemic and topical use but also all products used for environmental disinfection, directly affects resistance in the skin microflora and constitutes the second direct mechanism for influencing AMR in beauty salons. The detailed examination of differences in the regulation and implementation of standard precautions in beauty salons across countries (Belgium, the Netherlands, Luxembourg, Wales, the USA, Canada, Australia and New Zealand) is particularly impressive. Despite substantial differences between national regulatory models, the requirements applicable to beauty salons show clear convergence around the universal principles of standard precautions established by the WHO.

The author also focuses on the regulatory framework governing infection prevention and control in beauty salons in Bulgaria, examining its shortcomings and discrepancies with current international recommendations issued by the WHO. Emphasis is placed on the role of standard precautions, hand hygiene, aseptic techniques, appropriate processing of instruments and decontamination of the environment, as well as the importance of training, monitoring and a culture of safety as systemic components of effective infection control programmes. The author stresses that the effectiveness of infection control measures depends on their implementation in everyday practice, which is related to the knowledge, attitudes and routine practices of professional beauticians. A substantial body of evidence from scientific periodicals concerning knowledge, attitudes and everyday practices is analysed convincingly and in depth, demonstrating the doctoral candidate's very good understanding of the subject.

The **aim** of the dissertation is appropriately defined on the basis of the literature review. 5 objectives have been formulated to achieve it. 6 research hypotheses have also been formulated for the purposes of the study.

The **Materials and Methods** section is methodologically sound. A systematic review of scientific publications and official documents issued by health institutions, professional organisations and regulatory bodies has been conducted. Searches were performed in English and Bulgarian in the PubMed and Google Scholar electronic databases, using specific keywords and combinations thereof. Two original studies were conducted to address the research objectives:

Between September and November 2025, a descriptive cross-sectional study was conducted to examine the knowledge, attitudes and behaviour of young people aged 18–35

years regarding the prevalence of acne, self-medication and the use of antimicrobial agents. The study's inclusion and exclusion criteria are clearly defined. A questionnaire comprising 58 questions, organised into 6 thematic sections, was developed to investigate the knowledge, attitudes and behaviour of young people aged 18–35 years concerning self-medication for skin problems.

Between June and August 2025, a descriptive cross-sectional study was conducted to examine the knowledge, attitudes and practices of professional beauticians working in Bulgaria regarding infection control in their professional practice, as well as their attitudes towards AMR. The questionnaire comprises 45 questions, organised into 6 thematic sections. It should be emphasised that studies of this kind have not previously been conducted in Bulgaria. Appropriate statistical methods were used, with analyses performed using IBM SPSS Statistics, version 23. The results were presented graphically using MS Excel. The methods were selected in accordance with the research objectives, are informative and are described in detail.

Results and Discussion

The results of the studies clearly address the research objectives. They are accurately illustrated in tables and figures, explained in detail and supported by statistical analysis. The studies examine young people's knowledge and attitudes, as well as the frequency and patterns of self-medication with antibiotics for skin problems. The studies were conducted with a sufficient number of participants. The analysis covers sociodemographic characteristics, the prevalence and severity of acne, sources of information, awareness of the causes and factors affecting the course of the condition, attitudes towards treatment options and attitudes towards self-medication. The findings reveal widespread self-medication for acne, gaps in antibiotic literacy and the presence of risky behavioural patterns.

The data on knowledge of the side effects of antibiotics reveal both basic awareness and substantial gaps. Most participants – 71.4% of the young people – state that antibiotics have side effects, indicating a relatively good understanding of the potential risks. However, almost one-third of the sample (28.5%) do not recognise the risk of adverse effects or are uncertain about it. This is significant because underestimating adverse reactions may encourage self-medication and the repeated use of medicines without consultation. To date, data on the knowledge and attitudes, frequency and patterns of self-medication for acne among the young population in Bulgaria have been lacking, which underscores the relevance of the present study.

The study among professional beauticians reveals a discrepancy between their high self-assessment and their actual knowledge and implementation of some infection control measures. The findings support the research hypotheses to varying degrees. Taken together, the results indicate that preventing AMR requires simultaneous action on individual behaviour, professional practice and the regulatory environment. Improving antibiotic literacy, developing national guidelines for infection control in beauty services, and introducing structured continuing education for professional beauticians on infection control and reducing the risk of AMR emerge as key priorities. The discussion of the results is

comprehensive. Major studies are cited, and the experience and findings of other researchers are compared very effectively with the data from the candidate's original studies, demonstrating her sound understanding of the subject.

Contributions and Significance of the Dissertation for Science and Practice

11 conclusions and **5 contributions** have been formulated, providing an overview of the scientific and research work undertaken at all stages of the studies. I accept, in principle, the contributions stated by the candidate. The **recommendations** developed are also of particular practical value. They are grouped according to their intended recipients: the legislature, professional organisations and training institutions, the Ministry of Health, the Regional Health Inspectorates, professional beauticians, beauty salons, health institutions and public health professionals. Their value lies in their potential application to updating the regulatory framework and developing training programmes and educational initiatives. Two full-text articles published in Bulgarian scientific journals have been submitted in connection with the dissertation. The dissertation abstract reflects the structure and main elements of the dissertation.

Conclusion:

The dissertation submitted by Denitsa Ivanova Dimitrova fully meets the criteria laid down in the Act on the Development of Academic Staff in the Republic of Bulgaria, the Regulations for its Implementation and the Regulations on the Development of Academic Staff at Medical University – Varna for the award of the educational and scientific degree of *Doctor (PhD)* in professional field 7.4 Public Health. Its content and interpretation are original and relevant, its methodology is sound, and it is based on a large number of studies. The merits and contributions outlined above give me grounds to vote in favour and to recommend with conviction that the distinguished members of the specialised scientific jury give the dissertation a positive assessment.

Varna, 29 October 2026

Prof. Ilko Bakardzhiev, MD, PhD

Заличено на основание чл. 5, §1, б. „В“ от Регламент (ЕС) 2016/679