

## REVIEW

Of a PhD thesis on the subject of:

### CONTEMPORARY MODELS, NEW APPROACHES AND PERSPECTIVES IN TRAINING STUDENTS OF THE MEDICAL LABORATORY TECHNICIAN SPECIALITY

By **Yordanka Yordanova Mihaylova**

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The doctoral thesis is submitted **for awarding the educational and scientific degree  
Philosophy Doctor** in higher education area 7. Healthcare and Sports, 7.4. Public Health –  
professional field, Scientific Specialty Healthcare Management.

**Reviewer: Prof. Sonya Koleva Toncheva, DSc, PhD**  
**Deputy Director of the Shumen Affiliate, MU-Varna**

#### **Outline of the procedure**

Lecturer **Yordanka Yordanova Mihaylova** is a full-time doctoral student in the doctoral programme Healthcare Management for the acquisition of a PhD degree in higher education area 7. Healthcare and Sports, 7.4. Public Health – professional field. She was enrolled as a PhD student at the Department of Nursing Care, Faculty of Public Health, Medical University – Varna, by Order № P 109-508/04.11. 2020 of the Order of the Rector of MU-Varna with a scientific supervisor Assoc. Prof. Emilia Georgieva, PhD.

She was given authorisation to defend her doctoral thesis by Order No. 109-511/29.11.2023 of the Rector of MU-Varna. The Rector's order was based on Article 26, paragraph 6 and Article 30, paragraph 3 of the Development of the Academic Staff in the Republic of Bulgaria Act in Bulgaria, the Rules and Regulations for Academic Staff Development of the Medical University Varna (Article 68, paragraph 1) and the Minutes Summary No. 214/22.11.2023 of the Faculty Council of the Faculty of Public Health for successfully passed doctoral examinations.

#### **Biographical data and career profile**

Yordanka Yordanova Mihaylova was born on 18 May 1971 in Varna, Bulgaria. She completed her secondary education at the V Language School in 1988 in Varna. In 1990, she graduated from the Medical College – Varna with a speciality as a Medical Laboratory Assistant. In 2006, she graduated again from the Medical College as a Pharmacy Assistant.

She has three Master's degrees: a Master's degree in Health Administration from MU-Varna in 2001, a Master's degree in Social Pedagogy from Shumen University in 2007, and a Master's degree in Healthcare Management from MU-Varna in 2015.

In 2022, she acquired a speciality in Public Health. Since 2022, she has been a full-time PhD student in the Department of Nursing Care, Faculty of Public Health, Medical University – Varna.

**Yordanka Yordanova Mihaylova's** work experience began in 1990 in the clinical laboratory at the Children's Home for Medical and Social Care in Varna, where she worked for 22 years. From 2006 to 2017, she worked as an assistant pharmacist at Maxifarm Ltd. Ever since 2012 until now, she has been a lecturer at the Medical College – Varna in the Medical Laboratory Assistant Educational Sector. Mihaylova participates in the practical training of students of the Medical Laboratory Assistant speciality – oversees exercises, workshops, and clinical teaching practice for students. Mihailova aspires to enhance theoretical knowledge and hands-on experience by engaging in various forms of postgraduate training, which helps her shape her research and teaching skills.

Yordanka Mihaylova is the author and co-author of 20 publications. She has participated in more than 10 scientific forums. She is an academic mentor in the Student Practices project. In May 2023, she participated in a project in Torino, Italy (PROJECT BG05M2OP001-2.016-0025-C02). In December 2023, she was an Erasmus+ programme participant in Edirne, Turkey.

Mihailova's interests are in the fields of medical laboratory practice, pharmacy, alternative treatment methods, foreign languages and culture, pedagogy, advanced teaching approaches, etc.

She is fluent in French, English and Russian. He has good computer literacy.

### **General characteristics of the thesis**

The thesis, submitted by **Yordanka Yordanova Mihailova**, was developed at the Department of Nursing Care, Faculty of Public Health at the Medical University – Varna. The thesis is structured in seven chapters and contains 130 pages, including 10 tables, 33 figures, and 4 appendices. The researched opinions could have been consolidated into a single chapter in terms of structure (*Chapter III*) with several parts, as the presented Chapters III, IV and V are relatively small in volume, artificial fragmentation is unnecessary, and it is challenging to grasp the details. A subsequent *Chapter IV* could offer a comparison of the opinions of the three groups of respondents regarding the establishment of a Master's program, the SWOT analyses presented by the author, as well as the proposed curriculum for a Master's program in Medical Laboratory Management for the speciality of Medical Laboratory Technician with a Professional Bachelor's degree. This approach would have resulted in a more organised thesis structure and a stronger presentation of the findings in support of the innovative approach proposed by Mihailova.

The results from the opinion survey of the three groups of respondents show a basic breakdown of shared viewpoints. It would have been better if the different groups had been given the opportunity to answer the same questions with the possibility of comparison and, therefore, of deepening the analysis. *In future research, I advise the PhD candidate to achieve results that*

*can be compared with other studies, bridging the opinions of diverse groups through shared attributes and more sophisticated graphical and tabular representations.*

There are 158 references cited, of which 96 are in Cyrillic, 38 are in Latin, and 24 are internet sources. *It would be beneficial for Mihailova to prioritise citing Internet sources correctly – the relevant article and author should be indicated, not just a website, as, e.g., sources 148, 151, etc., are indicated.*

The thesis was debated and presented for defence at the Departmental Council of the Department of Nursing Care at MU "Prof. Dr Paraskev Stoyanov" – Varna on 15.02.2016.

### **Assessment of the subject relevance**

The subject explored by **Yordanka Yordanova Mihailova** is highly relevant. Currently, it holds great significance as various transformations in higher education are being implemented to enhance students' educational experience. The PhD student has developed her research thesis considering differences in educational degrees in our country and some European countries and the attitudes of students and employers from the laboratories. The focus is on the educational components and professional development of the medical laboratory technician. Improving the qualification of medical laboratory technicians in our country is a topical issue, especially in the context of European requirements for training medical professionals, the possibility of free movement of human resources, and the expressed aspiration of students to explore their potential in various European countries. It is theoretically and practically proven that an educated medical laboratory technician if continuously maintaining and improving his/her qualification, has the potential to increase participation in medical lab settings with different profiles and participate in prevention and the medical diagnostic process. Currently, such specialists can be found in all EU member states, where their roles and tasks are strictly regulated and coordinated with the other multidisciplinary team members.

In our country, there is still a subjective attitude of the rest of the team members and a certain underestimation of medical laboratory technicians. From this perspective, the method developed by Yordanka Mihailova's thesis is highly relevant, with the undeniable scientific proof that medical laboratory technicians should have a bachelor's degree and a master's degree, as well as take on greater responsibilities in the diverse activities and management of medical laboratories. The role of a medical laboratory technician is constantly evolving in response to the ongoing advancements in medical equipment for analysing samples and biological material, discovering new markers, etc. The level of accuracy demanded in the work of laboratory technicians is constantly rising.

The author's research is highly valuable in three aspects:

1. *Study of the attitudes and expectations of medical laboratory technicians regarding the improvement of their qualifications and, on the other hand, the study of the opinion of users of health professionals regarding the professional training and competencies of medical laboratory technicians.*
2. *Based on research, a Model for a Master's program in Medical Laboratory Management for medical laboratory technicians is proposed, supported by the expressed opinion of students, experts and working medical laboratory technicians.*

3. *Diverse forms of education are recommended to aid laboratory technicians in developing their skills within the medical laboratories.*

The in-depth analysis of best practices in different European countries for the training and career opportunities of medical laboratory technicians provides the author with a rationale to observe the fact that in our country, the activity of medical laboratory technicians is insufficient, and practically, the healthcare system is deprived of some of its resources. She concludes that the reform must carry on and that laboratory professionals specialising as Medical Laboratory Technicians educated in Bulgaria must meet European educational criteria. The underestimation of the potential contribution that medical laboratory technicians could have if adequately trained is a significant failing of our health system, and Mihailova scientifically proves this in her thesis. *In light of the current shortage of laboratory technicians in the country, this work holds great significance. The introduction of modern laboratory equipment and digital technologies in this health system sector has highlighted the need for additional competencies.*

Mihailova's approaches clearly demonstrate her abilities as a teacher and researcher, focused on producing exceptional student outcomes and ensuring successful career opportunities. Crafting a pedagogical concept focused on targeted training for enhancing the skills of medical laboratory technicians across different laboratory settings holds great practical significance.

### **Literature review**

The literature review is developed in a volume of 45 pages, presented in Chapter I.

The review highlights 3 main headings: "The medical laboratory technician – role and position in the healthcare system", "Specificity of the training in the speciality Medical Laboratory Technician", and "The profession of Medical Laboratory Technician in modern healthcare". Extensively studied are: *Evolution of the speciality Medical Laboratory Technician; European Qualification Framework; Job description of the medical laboratory technician; Types of training and teaching methods; Electronic learning resources – revolutionising training.* The presented approaches outline the existing differences in our country and *the Current Models in training medical laboratory technicians.* One cannot ignore the extensive overview of the thesis' entire volume and the excessive fragmentation of different aspects of professional training and career opportunities of medical laboratory technicians without achieving greater depth.

In the literature review, the author performs a **SWOT analysis of e-learning methods, defines e-learning resources as a new approach in the training of medical laboratory technicians and focuses her attention** on exploring the opinions of different groups of respondents on the subject of the thesis.

The literature review was constructed through extensive use of sources. The researcher carefully analysed and demonstrated a comprehensive understanding of the viewpoints of other authors on the selected subject. *Despite the critical remarks, Yordanka Mihailova possesses exceptional skills in utilising literary sources and articulating her perspective on the thesis subject.*

## Research structure

Chapter II outlines the research methodology. Based on the literature review, the aim and the main research hypothesis are successfully derived, although the aim needs a more precise definition. There are 5 tasks and 3 working hypotheses formulated. They are designed to meet European standards and incorporate new techniques and methods for training medical laboratory technicians. The stages of the study are correctly presented in tabular form. The reliability of the results obtained has been ensured through a range of methods implemented by the author. *A documentary method* was used to study important international documentation and authorised academic records of the speciality of medical laboratory technicians. A *sociological method* was applied through an anonymous survey of two groups of respondents: 1st, 2nd and 3rd-year students of the speciality Medical Laboratory Technician at the Medical Colleges in Stara Zagora and medical laboratory technicians working in the following medical institutions – St. Marina University Hospital – Varna, St. Anna Hospital – Varna, Military Hospital Varna. The approach for the *interview with experts* (users of health professionals) from the following medical institutions – St. Marina University Hospital – Varna, St. Anna Hospital – Varna, and Military Hospital Varna is interesting. *The questionnaire method* was applied to study the opinions of 179 individuals, distributed as follows: **working medical laboratory technicians – 79; students studying in the speciality Medical Laboratory Technician – 100.** An omission was the lack of information regarding the specified range of students in each college. **Experts (n=10) were interviewed.** It is confusing how the author defines the type of interview as semi-structured (in Chapter II) or standardised (Appendix 3). The confusion shows a lack of expertise in the methods of research. Moreover, there are significant differences in conducting the interview face-to-face and over the phone.

Proprietary survey tools were self-developed for the purpose of the research. Various statistical methods have been used to process the primary sociological information. However, the results also describe statistical methods that were seemingly not utilised. The methodology needs additional information: for example, how the sample of students from the Medical colleges in Varna and Stara Zagora was formed, what laboratories the experts were from (only the medical institutions are mentioned), and inclusion and exclusion criteria were developed for each group separately.

## Results

The thesis presents the results of a large body of work carried out by the author. The results are logically organised and structured in Chapter III and Chapters IV, V and VI, and the practical and applied aspects of the research are presented.

*Chapter III, Results and Discussion of the Survey among Working Medical Laboratory Technicians*, discusses the main characteristics of the surveyed medical laboratory technicians, explores career opportunities in laboratory medicine, outlines the reasons for the shortage of medical laboratory technicians, and explores potential opportunities in the workplace by pursuing advanced qualifications. Different viewpoints are considered regarding the organisation of courses or postgraduate training programmes. Significant results in this section highlight the satisfaction of medical laboratory technicians with the acquired knowledge and skills, their career performance in the working environment (79.75%) and their willingness to

enhance skills through courses and Master's programs (82.28%). In the author's view, factors such as reputation, professional advancement, efficient patient management, and personal growth play a significant role. Working professionals recommended enhancing the teaching practice component of Medical College training, as well as the addition of summer internships (89.87%, n=71). Fewer but more than 50% believed that the core course curriculum should be expanded (54.43%).

The author highlights the main problems related to the training and professional opportunities of medical laboratory technicians. Based on this, she developed the concept for a **Master's Program Model**. Mihailova argues that this approach will increase professional self-confidence and elevate the image of these specialists as part of the medical teams in which they work.

The final remarks solidify this thesis section and emphasise the significance of the following chapter.

*Chapter IV, Results and Discussion of the Survey among Students Studying in the Medical Laboratory Technician Speciality*, examines students' satisfaction with the training process. The chapter evaluated the theoretical and practical training, as well as the hybrid (electronic and face-to-face) form of training. The study examined the level of competitiveness and awareness of continuing education among students. According to the results, most are well acquainted with the legal framework regulating the professional competencies in the speciality Medical Laboratory Technician in the Republic of Bulgaria (61%). According to the expressed opinion, the medical colleges in Varna and Stara Zagora offer an up-to-date educational experience with a high level of teaching, excellent curriculum and technical facilities (80%). Students highly appreciate the relevance of the lecture material (89%), the conduct of teaching practice and the pre-degree internship (55%). More than half of the respondents believe they are ready to start working immediately, both at home and in other countries (52%).

The final section of this chapter presents the main findings, although some of the conclusions may be flawed. They refer only to the speciality at the Medical College – Varna and the facilities provided by the Medical University of Varna.

*Chapter V, Results and discussion from the interview with managers of medical diagnostic laboratories*, presents the results of a semi-structured (could also be discussed as in-depth) interview with owners and managers of medical diagnostic laboratories (n=10). The interview is on issues concerning the skills and competencies acquired by working medical laboratory technicians. The discussion explores their training and the need for a postgraduate qualification, the theoretical and practical training of medical laboratory students, the advantages and disadvantages of the Professional Bachelor's degree and the need for reform in education. The experts have provided valuable recommendations that can be summarised as: *Increase the hours of teaching practice (R1, R3, R4, R5); Introduction of summer internships (R8, R5, R10); Teaching practice to take place in private medical diagnostic laboratories accredited for teaching (R2, R4, R8); A new qualification degree meeting the European requirements (R6, R8, R9, R10); Continuing education (Master's degree) with subjects closely profiled for medical laboratory technicians (R1, R5, R6, R7, R10); Specialisation for the specific field (R2, R3, R7, R8, R9)..*

*Chapter VI* presents a Master's Program Model. Based on the results and the SWOT analysis, the author convincingly generated the idea for presenting a **Master's Program Model** to express the vision of training qualified and well-equipped laboratory scientists who would be competitive in a dynamically changing environment. In this chapter, a **Curriculum Model for the Medical Laboratory Management speciality after professional Bachelor's degree** with a minimum of 1035 academic learning hours (including the compulsory subjects and two elective courses) and a minimum of 126 credits (including the compulsory subjects, two elective courses, and a state examination/thesis defence) is proposed. *The specifics of the curriculum are validated.*

The author concludes that *in a world of ever-evolving science and technology, incorporating new advancements and adjusting to the demands of the job market, a Bachelor's degree is necessary. An addition could be a Master's degree program specific to the speciality Medical Laboratory Technician, in which specialists build on the knowledge and competencies in the individual laboratory areas. It would be a logical and beneficial decision.*

The author has titled Chapter VII "**Conclusions, Recommendations and Contributions**". Six conclusions are formulated, omitting significant conclusions to the overall thesis.

### **Assessment of contributions**

This study represents a pioneering and thorough investigation of contemporary models, new approaches and perspectives in training medical laboratory technician students. Based on the results obtained, the author outlines the need to reconsider the role, functions and tasks of medical laboratory technicians. In light of this, Mihaylova emphasises the importance of additional training to solidify the position of medical laboratory technicians within the team focused on prevention and the entire treatment and diagnostic process.

The research results formulated conclusions, and recommendations outline the theoretical and practical contributions of the thesis.

The list of contributions presented in the thesis reflects relatively objectively the actual achievements of the author. From the contributions presented by the author, I acknowledge the following:

### **Theoretical and methodological contributions**

1. A historical review of the development of the speciality Medical Laboratory Technician in the Republic of Bulgaria is made.
2. A comparative analysis of the training in the speciality Medical Laboratory Technician in Bulgaria and other countries is presented.
3. The methodological approaches for training using electronic learning resources are described.
4. The scientific rationale for creating a specialised Master's program upgrading the professional Bachelor's degree of medical laboratory technician and Bachelor's degree and Master's degree from all professional fields of study in Bulgaria is presented.

### **Practical contributions**

1. The opinion of students studying in the speciality and practising medical laboratory technicians on the level of satisfaction and professional development, as well as their willingness to acquire higher qualifications, was studied.
2. The opinion of Clinical Laboratory experts on the professional training of medical laboratory technicians working in medical diagnostic laboratories was studied.
3. A curriculum model for a Master's program aimed at increasing the educational qualification degree of medical laboratory technicians with a Professional Bachelor's degree is proposed.

Within the thesis, there are *recommendations and proposals that can greatly benefit methodological aspects* in the activities of the Ministry of Health, Ministry of Education and Medical Universities/Colleges where Medical Laboratory Technician students are trained.

The thesis summary encompasses the key aspects of the thesis and is presented in 58 pages.

The author's research portfolio currently includes 4 scientific thesis-related publications in specialised journals, published in 2020, 2021 and 2023. Thus, Mihaylova meets the requirements for the Philosophy Doctor degree. *My advice is for the author to publish the outcomes of her thesis work in specialised scientific journals, both domestically and internationally, in order to reach a wider audience of healthcare educators and medical laboratory technicians.*

Despite some critical remarks to the thesis, the doctoral student meets the requirements of MU-Varna for awarding the educational and scientific degree of Philosophy Doctor. The developed thesis can be considered an actual scientific work with significant theoretical and practical contributions.

### **Personal impressions**

It is essential for me to communicate my impressions. I know Yordanka Mihaylova as my student in the speciality Healthcare Management and later as a lecturer at the Media College – Varna. I highly appreciate her honesty, positivity, and management skills. Open in character with excellent communication skills, inquisitive and consistent in her actions, she has established herself as a respected teacher and colleague. I believe that the accumulated tutoring and practical experience have enabled her as a doctoral student to correctly assess the existing reality by exploring issues related to the development of the speciality Medical Laboratory Technician. The proposed Model Curriculum for the Master's degree aims to bring about necessary changes in the education of medical laboratory technicians. Mihailova demonstrates the abilities of a researcher who effectively guides medical laboratory technicians towards adopting European standards and methods in their training. Her research and recommendations focus on elevating the practical role of the medical laboratory technician.

**In conclusion:** Considering the professional development, research accomplishments, and teaching performance, while also factoring in the requirements of the Academic Staff Development Act in the Republic of Bulgaria and the Rules and Regulations for Academic Staff Development at MU-Varna, **I give my positive evaluation and confidently recommend to the esteemed Scientific Jury to award Yordanka Yordanova Mihaylova with the**



**educational and scientific degree Philosophy Doctor in Healthcare Management** for the needs of the Medical Laboratory Assistant Educational Sector at the Medical College of MU-Varna.

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Reviewed by

**Prof. Sonya Toncheva, DSc, PhD**