

R E V I E W

from Prof. Dr. Kancho Trifonov Tchamov, PhD, member of the scientific jury according to order No. R- 109-428 / 04.12.2024 of Prof. Dr. Dimitar Raykov, MD - Rector of the Medical University "Prof. Dr. Paraskev Stoyanov" - Varna

Subject: procedure for acquiring the educational and scientific degree (ESD) "Doctor" with candidate **Teodora Radeva Dimitrova**, doctoral student in full-time study in the doctoral program "Health care management" **on the topic "Competencies and activities of the nurse as part of the invasive cardiology team."** from the field of higher education 7. "Healthcare and Sports" in professional direction 7.4. "Public Health" and the scientific specialty "Health Care Management" at the Department of "Health care" of the Faculty of "Public Health" at the Medical University "Prof. Dr. Paraskev Stoyanov" - Varna

Scientific supervisor: Prof. Sonya Koleva Toncheva, D.S.

1. Career development of the doctoral student

Teodora Radeva Dimitrova was born on June 13, 1976 in the city of Shumen. In 1997, she completed her studies at the Semi-Higher Medical Institute - Shumen and graduated as a general nurse. Her professional career as a nurse began in the same year at Emergency Medical Care Center - Shumen, and until 2013 she also worked in the ENT department at "MBAL - Shumen" AD. In the period 2013 - 2020, she worked as an angiographic nurse at SBALK Madara EAD, the city of Shumen. In 2020, after winning a competition, she was appointed as an assistant at the Department of Health Care at Medical University "Prof. Dr. Paraskev Stoyanov" - Varna, Shumen Branch. She was immediately involved in the training of students, as well as in the preparation and conduct of practical classes in the assigned and educational disciplines. The rapid adaptation to the requirements of teaching and integration into the academic community of the university allow the candidate to participate in a number of national and international congresses, conferences and projects. In December 2021, she was enrolled in a full-time doctoral program for training in the doctoral program "Healthcare Management" with the topic of the dissertation "Competencies and activities of the nurse as part of the invasive cardiology team". In 2022, she acquired the specialty "Clinical Social Work". The candidate is a member of the following professional and scientific organizations: Bulgarian Association of Healthcare Professionals; Bulgarian Association of Public Health; and European Association of Public Health. The information presented about the career development of the doctoral student shows a desire for professional development and improvement.

2. Data about the dissertation

The dissertation work of Teodora Dimitrova presented for discussion in a volume of 147 standard pages is structured in five chapters. The text of the work is illustrated with 61 figures, 19

tables and 6 appendices. The literature reference contains 171 sources, of which 45 in Cyrillic, 104 in Latin and 23 Internet sources.

The dissertation is presented in five chapters and is structured as follows: introduction; literature review; aim, tasks and methodology; results and discussion; model of a modern invasive nurse; conclusions, contributions, suggestions and recommendations; used literature and applications. The individual chapters of the work are chronologically related to the tasks set and meet the structural and content academic requirements for such a scientific work. In addition, six applications developed by the doctoral student as a methodological toolkit for studying the problem are presented. They include five questionnaires and one questionnaire for in-depth interview, aiming to analyze and evaluate the main competencies and activities of the nurse as part of the invasive cardiology team through a study: the opinion of patients hospitalized in invasive cardiology departments regarding the professional skills and trust in the invasive cardiology nurse (ICN); the opinion of experts regarding the activities and competencies of the ICN as part of the team through an in-depth interview; the opinion of experts and nurses on the development of a protocol and model for ICU activities and their experimentation; the readiness of nurses to be included in various thematic forms of continuing education in the field of invasive cardiology.

In thematic connection with the dissertation work, three scientific publications are presented, printed in Bulgarian medical journals, with which the doctoral student meets the requirements for a number of qualitative and quantitative criteria, determined by the RDAS at MU - Varna. The presented set of materials on paper and electronic media is in accordance with Art. 69 of the RDAS at MU - Varna and includes all necessary documents for conducting the procedure for defending the dissertation work.

2. Relevance of the dissertation work

The increasing diagnostic and therapeutic value of invasive procedures in patients with cardiovascular disease creates challenges for the education and preparation of nurses to practice in this highly specialized field. This trend translates into an increased need for precisely performed medical activities, professional competence and implementation of effective professional communication of the nurse as part of the invasive cardiology team. In specific cases, however, the combination of her competencies and activities remain highly dependent on state regulations. The complexity of cardiovascular management in acute and critical conditions requires specially trained and experienced nurses to ensure quality outcomes for patients. The medical nurse is important part from invasive cardiological team. It plays an essential role both in direct patient care and in the technical and organizational preparation of invasive procedures. The critical nature of the work requires a team-based sharing of responsibility for the quality and safety of patient care, both by cardiologists and nurses. On the other hand, the ongoing shortage of nurses threatens to destabilize the health system and represents a double challenge, expressed in a decreasing availability of registered nurses while the demand for nursing services is increasing. In Europe, trends to increase the scope of activity of nurses by improving their roles include granting them the formal right to be the first point of contact with patients, to perform certain tests, procedures, assessments and referrals of patients to other levels of medical care. Less common are authorizations for diagnosis, prescription of certain medications, and ordering of treatments and tests. In this sense,

interventional cardiology nursing (ICN) is being formed as a discipline within the care of cardiovascular patients, requiring interdisciplinary knowledge and skills.

In this context, the dissertation presented by Teodora Dimitrova treats a current, but unstudied in our country medico-social problem related to determining the scope of the competencies and activities of the nurse as part of the invasive cardiology team. The relevance of the presented dissertation work is also supported by the almost absent scientific studies and publications on this problem in our country.

3. Awareness of the problem

The 25-page literature review includes 172 literary sources, half of which were published in the last 10 years. The analysis of scientific publications is structured in four sections, which chronologically analyze the main aspects of the research problem, including: medico-social characteristics of acute myocardial infarction; emergence and development of cardiac catheterization; beginning and development of invasive cardiology in Bulgaria; the nurse as part of the invasive cardiology team and specific nursing care in a catheterization room.

The doctoral student demonstrates good literary awareness and analytical abilities to place the right emphasis on current problems related to: the spread of cardiovascular diseases among countries in the world and Bulgaria; the causes and risk factors for the occurrence of acute myocardial infarction; the chronology of the staged development of invasive cardiology in Bulgaria; the individual contribution of Bulgarian specialists to the clinical application of coronary angiography and cardiac catheterization; a comparative analysis of the regulatory requirements for certification and training of invasive nurses in some economically developed countries in the world and Bulgaria. The synthesis of the literary sources shows a thorough knowledge of the problem, good professional and terminological competence. The conclusions from the literary review served as the basis for formulating the goals and structure of the dissertation work. The summaries obtained convincingly substantiate the necessity and relevance of the study, supporting the chronological selection of its tasks and the approaches to their implementation.

4. Purpose, objectives, methodology and organization of the study

The goal and the eight tasks of the dissertation are clearly formulated, specific and justified. The subject, object and scope, the logical units and characteristics of the study are defined in detail. The study included 196 individuals, divided into the following three groups of respondents: patients, planned for hospitalization in clinics or departments of invasive cardiology (n=130); nurses working in angiographic laboratories for invasive cardiology (n=35); and experts - doctors (n=31) invasive cardiologists and senior nurses working in hospital structures for invasive cardiology. The logical units of observation include representatives of the above three groups of respondents selected on the principle of voluntariness and random selection. The methods for selecting the logical units, the criteria for their inclusion and exclusion and the stages of the study are precisely defined. The study was conducted in 7 hospital health facilities (UMBAL – 3, MHAL – 3 and SBAL – 1) located in six towns of the country – Varna, Ruse, Pleven, Gabrovo, Montana and Panagurishte.

A combined methodology was applied to collect information using five questionnaires: for hospitalized patients in intensive care cardiology departments; for experts - doctors and senior nurses working in an angiography room; for expert doctors and nurses working in an angiography laboratory. A toolkit was developed for conducting in-depth interviews with invasive cardiologists and senior nurses practicing in an angiography laboratory. *The Protocol for the Activities of the Invasive Nurse and the Sheet for Activities during Selective Coronary Angiography (SCA) were developed and tested in angiography laboratories.* A high degree of correspondence was achieved between the 8 tasks set, the number of scientific interventions undertaken and the results obtained. The chosen research methodology allows for the successful achievement of the set goal and adequate solution of the tasks in the dissertation work. The research methods are successfully selected, comprehensively described and statistically validated. The study is multi-layered and labor-intensive to implement, due to the diverse elements of the tools used, which increases the cumulative effect of the quality of the scientific and practical contributions. In the design of the study and the analysis of the results obtained, the following methods were used: historical, documentary, statistical, experimental, etc. I should note the high quality of the methodological tools, the precision of the conducted study and the reliability of the results obtained, for which the scientific supervisor Prof. Sonya Toncheva, D.Sc. definitely deserves credit.

5. Evaluation of the results obtained

The results of the own study are presented in the third and fourth chapters of the dissertation with analyses and assessments of the socio-demographic characteristics of the three groups of respondents; of the preliminary preparation and adaptation of nurses to work in an angiography laboratory; of the opportunities for forming professional competencies in the training process; of the nurse-patient relationship during an invasive examination; of the activities and competencies of nurses working in an angiography laboratory; and of the need for specific nursing documentation in an angiography room.

The analysis of the results in Chapter III begins with a detailed socio-demographic characteristic of the surveyed groups of patients and nurses and experts, according to the following indicators: gender, age, place of residence, education, specialty and experience in the specialty. The results obtained from the analysis of the responses of the individual target groups are presented and interpreted in 7 thematic sections, corresponding to the tasks set. The targeted set of observation signs in the survey questionnaires and the precise statistical processing ensure the reliability, quality and credibility of the obtained results and the conclusions drawn.

The socio-demographic characteristics of the 130 patients studied revealed: male patients – 60.8% and female patients 39.2%. The largest share of patients is in the age group 51 – 60 years (32.0%), followed by those over 71 years (28.0%). Patients living in cities are 73.8%, and those living in rural areas are 26.2%. Those with secondary education are 68.0%, followed by those with higher education (23.1%) and primary education (16.9%). The socio-demographic statistics of the nurse respondents revealed the largest share of those holding the EQD “Specialist” – 27.8%, followed by those who have acquired a Master's degree (25.0%) and a Bachelor's degree (25.0%) in the specialty “Healthcare Management”. Among the nurses, those with 20-30 years of experience in the specialty (27.8%) and those with 6-10 years of experience in the angiography

room (36.1%) predominate. The information obtained on the work experience and place of work of the expert doctors, invasive cardiologists and senior nurses from clinics/departments of invasive cardiology shows that the largest share is those working at the University Hospital - 48.4%, followed by experts practicing at the General Hospital - 41.9%. The experience of the experts was studied as another significant factor for the quality of work in the catheterization room. The majority of the experts have experience between 10-20 years (38.3%) and between 5-10 years (32.3%), and the least of the respondents have over 20 years of experience – (9.7%).

The results of a survey of nurses' opinions on the need for prior training for work in an angiography room indicate a high degree of necessity (91.7%) and are presented in quite detail according to: the educational and qualification level of the respondents; according to the duration of their internship in the angiography room; the rank of the medical institution - University Hospital, Multi-specialty Hospital, SBAL.

Expert opinion on the need and possibilities for maintenance and improvement of knowledge and skills in order to increase the professional competencies of angiographic nurses was studied through an in-depth interview. The prevailing opinion of the experts is that postgraduate training is a necessary step for improving knowledge and skills (92.0%). The results of the in-depth interview were analyzed in quite detail, presenting a wealth of information: about the preferred forms of postgraduate training (training courses, specializations, participation in scientific forums and exchange of experience); about the periodicity of updating knowledge; about the need to introduce a specialization "Invasive Cardiology Nurse"; and about the need for postgraduate training according to the nurses' experience in the angiographic room. The opinion of the experts (100%) and nurses (97.7%) is categorical that the training of a newly admitted nurse in an angiography room should be carried out in a real working environment. A significant number of experts (65%) believe that a specialized course is the most appropriate form of training for a newly admitted nurse. The analysis of the results shows that experts and nurses are aware of the need for specialized training in invasive cardiology, as well as the role of mentoring and the exchange of experience and knowledge between colleagues as an important form of training.

The doctoral student studies the factors that motivate nurses to work in an angiography laboratory, as well as the time needed to adapt to the work environment. According to the surveyed nurses, the factors that motivate them to work in this environment are arranged as follows: a good microclimate among the staff - 38.9%; opportunity to increase competence - 36.1%; a sense of teamwork - 30.6%; work in a multidisciplinary team - 27.8%; and good pay - 22.2%. The prevailing opinion of the experts from the in-depth interview is good pay as a motivating factor for work. There are certain differences in the assessments of the experts and nurses regarding the time needed to adapt to the nature of work in an angiography laboratory, with the optimal adaptation period according to the experts being 6-12 months (51.6%), and according to the nurses 3-6 months (47.2%).

The analysis of the nurse-patient relationship during an invasive examination emphasizes the patient's opinion regarding communication, trust, and evaluation of nursing care, focusing on: the need for communication with the nurse in the angiography room and during an invasive procedure; the nurse's skills in reducing patient anxiety during the examination; trust in

angiography nurses; the evaluation of nursing care in the angiography laboratory. The results were statistically processed by gender, age, and education of the respondents.

The results of the study of the activities and competencies of the nurse working in an angiography laboratory are of a beneficial nature. The opinion is unanimous regarding the activities and responsibilities that the nurse performs in an angiography room as: assisting nurse (97.2%) sterile nurse (94.4%); and documenting nurse (80.6%). According to the experts' opinion, the qualities that the angiography nurse should possess should include: responsibility (100%); discipline (96.8%); communication (83.0%); observation and stress resistance (80.6%); empathy (54.8%). The respondents - nurses define the activities that they need to perform as part of the invasive cardiology team as follows: work in emergency conditions (91.7%); work with specific medical supplies (75.0%); work with specific equipment (72.2%); work in sterile conditions (55.6%); dosing of drugs (27.8%); work in a multidisciplinary team (25.0%). These activities include patient preparation, assistance during the procedure, post-procedural care and administrative duties. The results obtained from the experts' responses regarding the competencies and activities of the invasive nurse, which the doctoral student categorized into the following three key areas, are of scientific and applied significance: clinical, technical and educational competencies.

Scientific and applied contribution represent the results of studying the need to introduce specific documentation to reflect nursing activities in an angiography room. Almost half of the surveyed nurses (47.2%) believe that additional nursing documentation is not necessary because it "makes nursing activities difficult", "we fill out enough documentation". The need to introduce algorithms in the work of the angiography laboratory is indicated by 50.0% of the nurses. Of interest are the highly positive attitudes of experts (93.5%) and nurses (69.4%) regarding the need to introduce a "Protocol for the activities of the invasive nurse". It is believed that this will facilitate the training of newly admitted nurses; will reduce stress in critical conditions; will increase the satisfaction and security of the invasive nurse.

The fourth chapter of the dissertation synthesizes the results of the conducted study, which find practical implementation in the formulation of innovative tools and models for increasing the quality and effectiveness of the invasive nurse's activities as part of the invasive cardiology team. The scientific results obtained in the previous chapter find their application in the following fully developed experimental models and applied scientific tools:

- Developed model of the modern invasive cardiology nurse;
- Preparation of a Protocol for the activities of the invasive nurse;
- Conducting an experiment by implementing the IMN Activity Protocol;
- Developed a Fishbone model for activities during the SKAG;
- Algorithm of invasive nursing activities in cardiopulmonary resuscitation.

The SWOT analysis and the subsequent survey allow the experts to determine the necessary qualities and professional skills of the modern angiographic nurse (AN) for effective work in an angiographic room. This allows the doctoral student to develop and present a *Model of the modern invasive cardiology nurse*. The model includes the following three key aspects, defining a set of

determining elements for her role in modern healthcare: personal qualities; teamwork skills; and lifelong learning.

The identified lack of unified documentation describing the sequence of steps in specific manipulations performed by the AMS led the doctoral student to develop a *Protocol for the activities of the invasive nurse*. The protocol includes a detailed description (algorithm) of the activities and behavior of the assisting, sterile and documenting nurse. An experiment was conducted to implement it in the practice of the invasive cardiology clinics of the University Hospitals in Varna and Ruse. The structure of the Protocol contains brief information about equipment and procedures performed in the angiography room; a description of the goals and tasks; an algorithm for the preparation and activities of the assisting and sterile AMC is presented; access methods; a list of the necessary equipment, consumables and medications, etc. It was presented and developed by the doctoral student *Fish for the activities of the AMC during SCAG* as an element of nursing documentation.

The results of the study are of a beneficial nature, the opinion of experts and nurses regarding the assessment of the effectiveness and the need for the introduction of *the Protocol for the activity of the invasive nurse* in practice before and after the experiment. Both groups of respondents confidently express a positive opinion about the introduction of the Protocol as follows: experts – 83.3% and nurses – 75.0%. The hesitant opinion is equally distributed between the two groups of respondents (16.7%). The share of respondents (experts – 83.3%, nurses – 75.0%) who believe that the implementation of the Protocol will ensure efficiency, consistency and safety in the provision of intensive nursing care is also high. Of particular interest is the assessment of the effects of implementing the Protocol in the time range before and after the experiment. The fourth chapter concludes with information-based positive summaries regarding the benefits of implementing the Protocol for: minimizing errors in the angiography room; effective use of resources; increasing coordination in team actions; ensuring safety for patients; providing support for training and development; standardization of the practice of the angiographic nurse. The formulated summaries significantly mark the directions of the scientific and applied contributions of the dissertation work.

6. Assessment of Contributions

I believe that the dissertation presented by Teodora Radeva Dimitrova has contributions of a theoretical-cognitive, scientifically-applied and informative nature, the main ones of which are:

- The historical development of invasive cardiology in Bulgaria and the experience of a number of economically developed countries in the world in the training and certification of invasive nurses were studied.
- An original survey was conducted of the opinions of patients, nurses, and expert physicians and senior nurses working in intensive care cardiology clinics/wards regarding the competencies and activities of the invasive cardiology nurse.
- The study on the attitudes and motivation of angiography nurses to work as part of the invasive cardiology team.
- A theoretical model of the modern invasive cardiology nurse working in an angiography room has been developed.

- A SWOT analysis of the professional development of the angiographic nurse was conducted.
- The following original innovative tools and models have been developed and experimentally tested:
 - ✓ Model of the modern invasive cardiology nurse;
 - ✓ Protocol for activities of the invasive nurse;
 - ✓ Model of a sheet for ICU activities during selective coronary angiography (SCAG);
 - ✓ Algorithm of invasive nursing activities in cardiopulmonary resuscitation.

In conclusion, I should emphasize that the analysis of the respondents' answers is precisely presented with numerous figures and tables that reveal existing correlations, detailed in the conclusions. The main conclusions, 9 in number, are systematized in the main thematic areas, accurately reflecting the results obtained, respectively, the goal and objectives of the dissertation work. The proposals made are comprehensive and of a recommendatory nature. They are institutionally addressed to the Ministry of Health, to the Medical University and the Bulgarian Association of Healthcare Professionals, as well as to the Bulgarian Society of Interventional Cardiology.

The content and quality of the abstract meets the requirements of the Regulations of the Medical University of Varna, and faithfully and adequately reflects the main results of the study.

In conclusion, I believe that the dissertation presented by Teodora Radeva Dimitrova on the topic "Competencies and activities of the nurse as part of the invasive cardiology team" meets the requirements of the Academic Staff Development Act in the Republic of Bulgaria and the Academic Staff Development Regulations of MU-Varna in terms of the relevance of the problem, precision of the methodology, quality of the results obtained and scientific contributions.

In this regard, I will vote positively and I strongly recommend that the members of the Scientific Jury award Teodora Radeva Dimitrova, a full-time doctoral student in the doctoral program "Health Care Management" of the Faculty of Public Health at MU-Varna, the educational and scientific degree "Doctor" in the field of higher education 7. "Health Care and Sports" in the professional field 7.4. "Public Health" and the scientific specialty "Health Care Management".

18.01.2025

Sofia

Reviewer:

Заличено на основание чл. 5,
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Prof. Dr. Kancho Tchamov, MD