

REVIEW

BY PROF. PETIA DIMITROVA TZVETKOVA, DMedSC

"Prof. Dr. Asen Zlatarov" University – Burgas

of a dissertation for the award of the educational and scientific degree of "**Doctor**"

Professional field: **7.1. Medicine**

Doctoral program: **Urology**

Author: **DR. BLAGOVEST PESHKOV PETROV**

PhD Program Type: **Full-time**

Department: **Urology and General Medicine**

Topic: **"CLINICAL AND EPIDEMIOLOGICAL STUDIES ON *TRICHOMONAS* IN INFERTILE MEN"**

Academic Supervisors:

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1. General Overview of the Procedure and the PhD Candidate

The submitted dissertation, comprising a set of materials in both hard copy and electronic formats, complies with Article 70(1) of Section I ("Acquisition of the Educational and Scientific Degree of 'Doctor' and the Scientific Degree of 'Doctor of Sciences' at MU-Plovdiv") of the MU-Plovdiv Regulations dated January 28, 2021.

The PhD candidate has submitted four publications—including one in a Bulgarian journal indexed in global scientific literature databases (*Folia Medica*), as well as documentation of participation in two scientific forums and one project related to the dissertation.

2. Brief biographical details of the PhD candidate

Dr. Blagovest Petrov was born in 1994 and completed his medical education at the Medical University of Plovdiv in 2019. Since 2021, he has been a full-time PhD student at the Department of Urology and General Medicine, where he is currently also a resident physician.

3. Relevance of the topic and appropriateness of the set goals and objectives

The PhD thesis submitted to me for review is titled "Clinical-Epidemiological Studies on Trichomoniasis in Infertile Men" is a topical issue in the lives of modern men, and not only in our country.

Despite advances in modern medicine, sexually transmitted diseases continue to threaten people's health and well-being; they are widespread globally and constitute a serious public health problem.

It has been established that sexually transmitted infections of the reproductive system are a universal etiological factor in both inflammatory diseases and fertility disorders in couples. Non-venereal sexually transmitted infections—specifically those involving *Trichomonas vaginalis*, which accounts for over 30% of infectious diseases affecting the male reproductive system, constitute an indisputable part of the causes of impaired reproductive capacity in the individual.

The points outlined above convincingly justify the choice of topic and its discussion.

The significance and relevance of the dissertation stem from the study's focus on the diagnostic, clinical, and pathogenetic characteristics of the protozoan pathogen *Trch. vaginalis* and its impact on male fertility.

Dr. Petrov clearly outlines the relevance of the topic by focusing on the difficulties and shortcomings in diagnosing trichomoniasis, the issue of prolonged carriage, and the lack of etiological treatment—factors that lead to long-term damage to male reproductive organs and, consequently, to fertility. Infertility is a global health issue that raises numerous questions regarding its underlying causes; the study of the protozoan *Trch. vaginalis* presented in this dissertation offers important insights into its role as a male factor in the etiology of infertility.

The specific tasks addressed during the development of the dissertation are concentrated in four main areas; these are aptly defined and effectively substantiate the objective of the doctoral candidate's research.

4. Understanding the subject matter

Dr. Petrov demonstrates a detailed understanding of the issue; the approaches applied in the study are logically sound and scientifically grounded, supported by a literature review that is remarkably analytical in nature and reflects both comprehensive coverage and a thorough knowledge of contemporary literature.

The scientific hypotheses are appropriately formulated and linked to precise methods of verification.

In the dissertation, Dr. Petrov presents substantial scientific information from 264 authors -7 in Cyrillic and 257 in Latin script—demonstrating an in-depth understanding of the subject, particularly regarding global research findings from the last decade.

A detailed understanding of the specific problem enables the author to focus on employing specific methods that substantiate the study's objective.

5. Research Methodology

The materials and methods are presented in great detail and accurately reflect a comprehensive, multidisciplinary approach, attesting to the labor-intensive nature of the research.

It is to the doctoral candidate's credit that they have analyzed the problem not only within the timeframe of the study but have also presented the depth of the topic through a multidisciplinary approach, drawing upon the fields of urology, parasitology, and microbiology.

It is noteworthy that the candidate has consistently outlined the patient selection process and exclusion criteria, thereby ensuring a homogeneous and representative sample.

Thus, the chosen modern research methodology enables the achievement of the stated objective and provides an adequate response to the tasks addressed in the dissertation.

6. Characteristics and evaluation of the dissertation

The author has adhered to the conventions of dissertation writing and followed the standard structure, systematically presenting all sections: Aim, Objectives, Materials and Methods, Literature Review, and Results and Discussion. The approach taken to presenting the findings, along with their timely discussion and the resulting conclusions, facilitates the reader's detailed understanding of the issue under discussion.

The presented results follow the sequence of the established objectives.

The first subsection focuses on the epidemiology of trichomoniasis and presents data regarding mixed infections involving various pathogens affecting the male reproductive system. The conclusion highlights the controversial role of various contaminants in an individual's fertility,

noting that this assessment was based solely on standard semen analysis rather than in-depth studies of the quantitative and qualitative aspects of spermatogenesis.

The second section addresses the clinical and epidemiological characteristics determining the prevalence and clinical course of urogenital trichomoniasis in the studied cohort of infertile patients. An interesting finding is the statistically significant association observed between the duration of the infection and the presence of mono- or mixed infections; the asymptomatic course seen in 33.3% of cases leads to the condition becoming chronic over time, potentially causing deviations from the patient's optimal fertility status.

Section 3 presents an analysis of sperm parameters in men infected with *Trichomonas vaginalis*.

The study compares two groups: infected men and uninfected infertile patients. It is unclear whether the latter serves as a control group; since they are patients with impaired fertility, does this mean there is no control group of healthy men? The explanation provided is illogical: it claims there is no significant difference in sperm parameters, yet both groups exhibit reduced sperm count and motility. The suggested explanation attributes this to the cytokinetic action of the contaminant's molecules, but the second group is not infected with that contaminant.

The reduced volume is attributed to the occurrence of agglutination; however, it should be noted that this phenomenon manifests most distinctly in cases of *Candida albicans* infection's.

An analysis of the quantitative and qualitative results regarding impaired spermatogenesis is conducted to address the lack of established evidence concerning the impact of *Trichomonas vaginalis* on fertility, an analysis based solely on existing literature rather than on the author's own in-depth studies. Naturally, this comment does not diminish the value of the PhD Thesis but rather serves as a recommendation for the doctoral candidate's future research.

The clinical-diagnostic algorithm developed by Dr. Petrov emerges as a key outcome alongside the other results presented and illustrated. This algorithm would be particularly valuable to clinicians with an interest or professional focus in the fields of reproductive biology and medicine, urology, epidemiology, and parasitology. The recommendation regarding the screening of patients with infertility, especially those with long-standing cases and the associated diagnostic approach is also of particular interest. I regard the approach taken to the subject matter as a significant contribution of the dissertation.

7. Contributions and significance of the study to science and practice

A well-prepared and driven young researcher, Dr. Petrov has successfully delved into the subject matter and adopted the correct approach to addressing the relevant tasks.

This has enabled the doctoral candidate to conduct a substantive analysis of his findings and formulate seven contributions comprising one of an original nature, four of a confirmatory nature, and two with clinical practices applicability.

All the proposed contributions are well-formulated and enhance the significance of the dissertation.

An important point worth noting is that the entire dissertation not only broadens the scientific perspective on the subject but also offers significant value for clinical practice.

It is impressive that Dr. Petrov's interests extend beyond what has already been achieved, with plans for future research already in place. He also openly acknowledges the challenges currently complicating the analysis of the results obtained.

8. Assessment of publications related to the PhD Thesis

As already noted in the "Presentation of the PhD Candidate" section, Dr. Petrov's participation in publications and scientific forums has been mentioned. These are related to the work under development.

I will not discuss them in detail, as they have already undergone peer review prior to publication.

9. Personal contribution of the PhD candidate

The PhD candidate's personal contribution to addressing the set tasks is clearly evident, reflecting close collaboration with academic supervisors or appropriate specialists regarding highly specific research methods, such as microbiological or embryological techniques.

10. Abstract of PhD Thesis

The submitted abstract meets all preparation requirements. Information regarding the objective, specific tasks, materials and methods, results, and their discussion is presented accurately. The conclusions drawn by the PhD candidate are clearly included, as are their specific contributions.

It is well-illustrated.

11. Critical remarks and recommendations

I have no significant critical remarks. My recommendation is to continue with enthusiasm, leveraging the expertise of specialists at MU-Plovdiv as well as international experience to further develop this timely topic, which still offers a niche for additional scientific inquiry.

12. Personal impressions

Unfortunately, I do not have any personal impressions of Dr. Petrov, but I am deeply convinced that this will change as we establish personal contact.

CONCLUSION

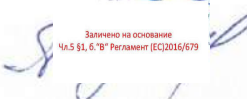
The dissertation presents scientific, applied-scientific, and practical results that constitute an original contribution to the field and meet all the requirements of the Act on the Development of the Academic Staff in the Republic of Bulgaria (ADASRB), the Regulations for the Application of the ADASRB, and the relevant regulations of the Medical University of Plovdiv. The submitted materials and dissertation results fully comply with the specific requirements of the Medical University of Plovdiv.

The dissertation demonstrates that the doctoral candidate, Dr. Petrov, possesses in-depth theoretical knowledge and professional skills in the field of Urology, while also displaying the aptitude and ability to conduct independent scientific research that is comprehensive in all aspects, including epidemiology, clinical presentation, parasitology, microbiology, serology, diagnostic screening, and more.

In view of the foregoing, I confidently give a positive assessment of the research conducted as presented in the dissertation, the abstract, and the achieved results and contributions and I recommend that the esteemed scientific jury award the educational and scientific degree of "Doctor" to Dr. Blagovest Peshkov Petrov in the doctoral program of Urology.

Reviewer:

Prof. Petia Tzvetkova, DMedSc


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