

STATEMENT EVALUATION

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On the Dissertation for awarding the educational and scientific degree "Physical
Doctor / PhD"

Of Dr. Zhenya Stoyanova Borisova

entitled "**Clinical, diagnostic and therapeutic studies on common bacterial skin
infections in childhood**"

Supervisor:

Assoc. Prof. Dr. Ilko Bakardzhiev, Ph.D.

According to the procedure for public defense of the above-mentioned dissertation work, I was selected as a reviewer by order No. R-109-213 of 03/28/2023. of **Prof. Dr. Valentin Ignatov, MD, Rector of the Medical University "Prof. Dr. Paraskev Stoyanov" - Varna**. The documentation provided to me is in accordance with the requirements of the Law for development of the academic staff in the Republic of Bulgaria, the Regulations for its application and the Regulations for development of the academic staff of MU - Varna. I have no scientific works in common with PhD student Zhenya Stoyanova Borisova.

Relevance of the dissertation topic

Bacterial skin infections represent one of the most common diseases in the modern world, the importance of which is associated with significant morbidity and often mortality, with a worsening of the quality of life of the affected patients, as well as with a great economic impact on the health system. This pathology is of particular importance when affecting childhood due to the high frequency of bacterial skin

infections in children, the uncharacteristic appearance of skin changes that may remain unrecognized in family and school setting, leading to a higher prevalence and increased risk of serious, sometimes fatal complications such as sepsis, osteomyelitis, acute glomerulonephritis, etc. That is why there is a need to increase the general medical culture and awareness of the population and to focus the attention of outpatient care physicians on skin bacterial infections. Elaboration of these problems helps to prevent these diseases and should be part of the strategy of any health program.

The topic of the dissertation is of relevance and indisputable importance in the modern medical, dermatological, and why not, pediatric practice and is dedicated to bacterial skin infections in childhood. In the current work, such important aspects of the problem as the demographic and risk factors and the dynamics of occurrence of some of the most common bacterial skin infections in childhood are studied and analyzed, as well as their clinical, diagnostic and therapeutic aspects.

All this determines the relevance of the dissertation subjected to this review.

Structure, general characteristics and evaluation of the dissertation

The dissertation covers *141 printed pages*. It is illustrated with *35 tables and 39 figures* of excellent quality, which mostly illustrate own results, some of which are included in the literature review.

The main sections of the dissertation fully meet the requirements and include: Literature review - 32 pages, Aim and tasks - 1 page, Material and Methods - 11 pages, Results of own research - 41 pages, Discussion of the results - 12 pages, Conclusion – 3 p., Conclusions and contributions – 2 p. Book review 26 p., Publications on the topic – 1 p.

The literature includes 339 references, 12 in Cyrillic and 327 in Latin. Scientific publications by Bulgarian authors available in the literature have not been omitted, and the balance between classic and modern articles with a predominance of sources after 2010 makes a good impression.

Knowledge of the problem and literature review

The literature review is thorough and comprehensive and demonstrates the PhD student's excellent knowledge of the research problem. From the very beginning, the reader is introduced to the essence of the problem, namely the peculiarities of child development and the normal flora of children's skin, including of some areas of the body, factors modifying the skin microbiome, after which the various etiological and nosological entities in the group of pyodermas are examined in detail. Along with the nosological classification, the currently applied therapeutic methods with a focus on childhood are examined. The analysis of the review is impressive, which is a very good basis for the well-formulated goal and tasks of the dissertation development, which comes to fill the currently existing ambiguities and missing links in the diagnosis of bacterial skin infections in the pediatric population.

Aim and tasks

The aim of the dissertation development is clearly and specifically formulated, namely to study and analyze the dynamics, demographic and risk factors, clinical, diagnostic and therapeutic aspects of common bacterial skin infections in childhood. In fulfillment of this goal, the dissertation student has set herself 6 tasks, which are also precisely and clearly formulated.

Material and Methods

The dissertation work includes a sufficient material, which comprises a total of 303 patients aged < 18 years, observed during a 6-year period (2012 - 2018). Patients are both outpatients referred for dermatological consultation from the clinics for pediatric diseases, pediatric oncohematology, and orthopedics and traumatology at the "St. Marina" EAD - Varna, as well as hospitalized patients in the Skin and Venereal Diseases Department of the same hospital. Two groups of patients were studied: 154 patients with bacterial skin infection and a control group of 149 patients with other skin diseases.

A good impression is made by the set of well-defined clinical and laboratory methods. Applied in a retrospective analysis of medical documentation (epicrisis, outpatient lists, laboratory tests) and clinical observation, as well as "classic" laboratory tests, including routine paraclinic (CBC with differential count, CRP, ESR, blood biochemistry), microbiological tests such as microscopy for morphological identification of bacteria and fungi, cultural studies and determination of antibiotic sensitivity (antibiogram by disk-diffusion method).

Appropriate statistical methods are selected ensuring the reliability of the obtained results, including descriptive analysis, independent T-test to compare the average age at diagnosis between the two studied groups (patients and controls), non-parametric chi-square test (χ^2) and crosstabulation and correlation analysis using the Spearman method to study the dependencies between different indicators to establish the strength of their mutual impact. SPSS for Windows software version 25.0 was used.

The results and discussion convince of the merits of the scientific development and demonstrate a high average annual incidence of bacterial skin infections in the Varna region, amounting to 17.48% of the total pediatric pathology. The comparative analysis of the age of the patients showed insignificant differences between the two sexes, with the mean age of pyoderma onset being 10.1 years. There is an increased incidence in children from 0 to 4 years and those over 11 years. The influence of environmental factors on the incidence of pyoderma in childhood peaks in the summer months, and an increased frequency of incidence is found in children living in urban settings. An essential factor for the development of bacterial skin infection in childhood is the presence of accompanying diseases, the carriage of a pathogen in the nasopharyngeal region, obesity and atopic dermatitis. The results of her own studies allow the doctoral student to conclude that, diagnosed in time and treated correctly, skin infections are almost always curable. With a delay in diagnosis or incorrect and/or insufficient treatment, some purulent dermatitis have the potential to cause severe complications. Good personal hygiene is key to the prevention of pyoderma in childhood.

Contributions and significance of the development for science and practice

In her dissertation, Dr. Zhenya Borisova presents a total of 5 conclusions, which logically follow the results of her own studies and their analysis. The most common bacterial skin infections in childhood patients were impetigo - 41.60%, folliculitis - 27.30%, ecthyma - 11.70%, furunculus - 11% and perionyxis - 7.10%. The localization of the infectious process is mainly on the extremities, and in terms of the morphology of the lesions, exudative rash units prevail, followed by erosions and crusts. An interesting conclusion is that the etiology of bacterial infections in childhood is dominated by Gram positive bacteria, especially *S. aureus*, incl. methicillin-resistant *S. aureus*, with the highest resistance of the pathogens being registered to the antibiotic cefazolin, and the lowest to ceftriaxone.

The abstract adequately reflects the structure and main components of the dissertation development.

The doctoral student indicated 7 contributions of an original, scientific-theoretical, and scientific-practical and confirmatory nature, which I fully accept.

Assessment of the publications related to the dissertation

According to the requirements, the dissertation student has submitted the necessary number of publications in connection with the topic of the dissertation work, namely - a total of 2 articles and 3 participations in scientific forums, in which Dr. Borisova (see Stoyanova) is the first author. This testifies to her scientific researcher's qualities and authorship contribution.

Critical remarks and recommendations

I have no significant comments regarding the structure and scientific content of the dissertation, which is written in literary Bulgarian language and an excellent style, which at the same time allows the reader to absorb the material well. Some critical remarks could be made which do not detract from its scientific value:

- the pages where the reader could find the used abbreviations are not mentioned in the content of the work (pp. 5-6);
- after the initial introduction of an abbreviation, it follows its use everywhere in the subsequent text;
- of a grammatical and rather "printed" nature, e.g. "Staphylococcus..." instead of "Staphylococcus..." (p. 18), "skin disease" instead of "skin diseases" (p. 107), "the above" instead of the available "The above" (p. 107), etc.
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CONCLUSION

In conclusion, the dissertation work of Dr. Zhenya Stoyanova Borisova, entitled "**Clinical, diagnostic and therapeutic studies on common bacterial skin infections in childhood**", was originally conceived and developed with correctly defined goals and tasks, with a correct selection of studies clinical material and applied methods - clinical, laboratory and statistical. The results of the own studies are presented in an unambiguous way and are thoroughly and competently analyzed by the doctoral student. The highlighted conclusions and contributions of the dissertation work are correctly formulated and logically follow the obtained results.

This gives me reason to recommend to the respected members of the scientific jury to give their positive vote and award **Dr. Zhenya Stoyanova Borisova** the educational and scientific degree "doctor".

Sofia, 29.05.2023

Reviewer:



(Prof. Snejina Vassileva, MD, PhD)