

**REVIEW**

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of a dissertation for awarding the educational and scientific degree

**"Doctor of Science"**

doctoral program: "Rheumatology"

**Department: "Propedeutics of Internal Diseases"**

Author: Prof. Dr. Stoyanka Georgieva Vladeva, MD

on the topic: **Current aspects of the osteoporosis fracture risk**

The set of materials presented to me on paper and electronic media for the preparation of this review is in accordance with the Law on the Development of the Academic Staff of the Republic of Bulgaria, the Regulations for application of this law in the Medical university of Plovdiv and the procedure for acquiring the Doctor of Science degree in the MU - Plovdiv, including all the necessary documents. In the presented certificate of compliance with the minimum national requirements, as well as those of the Medical University of Plovdiv for the scientific specialty "rheumatology", the fulfillment of the necessary quantitative indicators for conducting the present procedure can be seen.

The candidate for the scientific degree "Doctor of Sciences" Prof. Dr. Stoyanka Georgieva Vladeva was born in 1962. She graduated as a doctor in 1987 from the Medical University of Plovdiv. In 1996 she completed full-time doctoral studies at the Rheumatology Clinic, Sofia Medical University, and obtained the scientific degree "Doctor" after defending a dissertation on the topic "Clinical-therapeutic and immunological studies in patients with rheumatoid arthritis". In 1998, she became a chief assistant in Internal Medicine, in 2012 she acquired the title an Associate Professor of Rheumatology, and in 2014 she was awarded the title Professor of Rheumatology at the Department of Internal Medicine Propedeutics and the Department of Health Care at the Faculty of Medicine, Trakia University, Stara Zagora. Prof. Vladeva also conducts the post-graduate training in rheumatology at the Trakia University. She acquired clinical specialties in internal medicine - in 1998, rheumatology - in 2003, cardiology - in 2021. He has many years of clinical experience, including as Head of the Rheumatology Clinic, UMBAL" Prof. Dr. Stoyan Kirkovich" Stara Zagora and a large outpatient practice with dispensary patients. She has participated in the implementation of the National Program of the Ministry of Health since 2006 as the Director of the Osteoporosis Center in Stara Zagora. Prof. Vladeva has been the Chairman of the Association "Stara Zagora against Osteoporosis" since 2001. She is an active public figure in the city of Stara Zagora, having organized a number of activities for screening, diagnosis and prevention of osteoporosis. She is a member of the Bulgarian Medical Society for Osteoporosis and Osteoarthritis and the Bulgarian Rheumatology Society.

## **1. Relevance of the topic and appropriateness of the set goals and tasks**

The work of Prof. Dr. Stoyanka Vladeva is dedicated to the widespread rheumatological disease osteoporosis and the related fracture risk.

The topic of the dissertation is current and significant. Osteoporosis is a widespread rheumatological disease characterized by deterioration of bone microarchitecture and subsequent increase in bone fragility. An essential motive for the dissertation work is the creation of a specific national "FRAX" model, as well as the world data on the epidemiology of the disease in the world and in Bulgaria. New approaches for objectifying fracture risk and predicting fractures based on bone quality have been skilfully used in the dissertation work.

In addition, the author of the dissertation, for the first time in Bulgaria, conducted a REMS assessment of fragility index and fracture risk prediction "FRAX" using osteodensitometry. The set goals and objectives are supported by the results and conclusions. The obtained data have an important application in the daily practice.

## **2. Knowledge of the problem**

The author of the dissertation knows the problem in detail. She summarized the literary material on the basis of 255 literary sources, of which 7 are in Cyrillic and the rest are in Latin. The tools available worldwide for fracture risk assessment are comprehensively described. The possibilities for their use by both doctors, health professionals and patients are given. The academic approach of the doctoral student allows the unification of all aspects of modern osteoporosis risk assessment to be implemented both in primary and specialized

medical care of the country. For more than 5 years, Prof. Vladeva has been clinically working with the REMS methodology. Given the existing worldwide data on the possibilities of this innovative application of ultrasound osteodensitometry, comparable to DEXA, in recent years and the inclusion of the assessment of bone quality parameters, the thesis researcher has expanded the studies carried out with REMS on the topic of the thesis.

### **3. Research methodology**

The chosen methodology corresponds to the set goal and tasks. The collected vast informational, clinical and documentary material has been analyzed extremely precisely in terms of both retrospective and prospective analysis. The most up-to-date methods for statistical processing were used, made with a reliable statistical program such as SPSS version 19. The multivariate analysis of risk factors obtained on a large representative group of women is very important. The self-report study of patients on osteoporosis significantly increases the validity of scientific work.

### **4. Characterization and evaluation of the dissertation work**

The dissertation work is written in a volume of 173 pages. It is illustrated with 7 tables, 30 figures and 2 appendices.

The literature review is comprehensive and specific, covers 54 pages, represents a systematized review on the problem and shows the author's ability to select and critically analyze literary sources. The factors determining the fracture risk and the possibilities to define it for assessing the diagnosis and prevention of osteoporosis are described in detail.

The goal is clearly stated. There are 8 tasks and they are defined in support of the main objective.

The section "Clinical material and methods" is written on 19 pages. The results of DXA examinations of the axial skeleton of 12,478 people were collected. FRAX for MOF and FRAX for HF were assessed for the different age decades in 1,863 individuals between 40 and 90 years of age by DXA BMD. Axial skeletal osteodensitometry was also performed in 324 women with the innovative REMS technology, in addition to BMD, and fragility index, multivariate analysis of risk factors, and a patient self-report questionnaire about their fracture risk were also assessed.

The results are presented together with the discussion in 62 pages, systematized logically and written coherently. The discussion made shows the author's ability to critically and eruditely discuss her own results with previous studies. They are presented in tables, figures and graphs. The study carried out is an extensive study of the current aspects of fracture risk and the possibilities for its determination. The presented results are important practical contributions to rheumatology at home and abroad, especially for the prevention of osteoporosis. The overall prevalence of low BMD at the lumbar spine was 65.2% and at the femoral neck was 64.8%. The overall prevalence of osteoporosis at the lumbar spine was 27.7% and at the femoral neck was 12.6%. The currently conducted studies of BMD in Bulgaria are analyzed in the sense of building on the successes achieved in this field of science in Bulgaria and opens new horizons

for detailing both the ethnic characteristics and a wider inclusion of FRAX in a comprehensive approach for diagnosis and prevention of osteoporosis.

The dissertation has 12 main conclusions that summarize the results of the observations. 6 contributions highlighting the merits of the dissertation are outlined.

I accept all conclusions and contributions made in the dissertation work.

Prof. Dr. Stoyanka Vladeva has presented a total of 37 publications, of which 22 are in full text and 15 are reports published abroad. Of the publications, 27 are indexed in Scopus or Web of science, and the rest are published in non-indexed peer-reviewed journals. Two of the publications have been accepted for publication.

For the current competition, outside of the procedures for the acquisition of scientific titles, the doctoral student has submitted 27 citations, of which 20 are in journals indexed in Scopus or Web of science. The citations of the publications from the last two years are particularly significant, which played a great role for Bulgaria to be included in the global analyzes and forecasts of the osteoporosis epidemic.

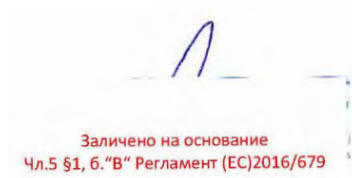
## **5. Abstract**

The abstract was made according to the requirements of the Rules of Academic Development in the MU of Plovdiv. The volume of 67 pages is sufficient, the structure covers and reflects the main results achieved in the dissertation. The most representative 8 tables and 22 figures were used.

## CONCLUSION

Prof. Dr. Stoyanka Vladeva, MD studied a precisely selected contingent of patients, correctly analyzed the results and thoroughly compared them with the available data from the world literature.

The requirements of DASRBA and the Regulations of the Medical University of Plovdiv for the acquisition of the degree "Doctor of Sciences" have been met. The dissertation contains theoretical summaries and solutions to important scientific and applied problems that correspond to modern achievements and represent a significant and original contribution to science. Therefore, I confidently give my positive assessment of the scientific work and the awarding of the scientific degree "Doctor of Sciences" under the Rheumatology Doctoral Program 7.1. Medicine to Prof. Dr. Stoyanka Georgieva Vladeva, MD.



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