

SCIENTIFIC STATEMENT

By

Dr. Borislav Dimitrov Ivanov M.D., Ph.D.

**Associated Professor of Neurology
Head of the Department of Clinical Medical Sciences
Medical University of Varna, Faculty of Dental Medicine
First Clinic of Neurology, University Hospital "St. Marina" Varna**

**Appointed member of the Scientific Jury,
According to Document P- 109- 301/ 07.06.2023
of the Rector of Medical University Varna**

**On dissertation thesis for obtaining scientific and academic degree
"Philosophy Doctor"**

"SLEEP DISORDERS IN SHIFT WORK"

**Authored by Dr. Aleksandra Krasimirova Yankova- Aleksieva,
Fulltime PhD student in Department of Optometry and Occupational Diseases,
Medical University of Varna**

Dr. A. Yankova's thesis is 114 pages long, 198 papers are included in the literature review, 4 of them by leading Bulgarian experts and 194 by foreign authors. Near the half of the reviewed sources are published during the last decade and a quarter during the last five years.

The thesis is well illustrated with 13 tables, 46 figures and 4 applications. Statistical analysis is made using the most up to date statistical instruments like SPSS v 29.0 и GraphPad Prism version 9.51.

In today's industrialized world 24-hour service has become indispensable to certain services such as public safety, health care and many others. Due to this one in every five workers has shift outside of the regular work hours from 9 AM to 5 PM. Some of these service providers develop Shift Work Disorder (SWD)- a condition, caused by a disruption in the circadian rhythm and presented with insomnia and/or excessive sleepiness. These sleep disorders lead to significant health problems, a worsened quality of life and can hinder the practice of the profession.

Shift work includes working outside of the regular work hours in twelve hour shifts during the day and night. According to certain European studies, conducted in the last 10 years, between 15 and 30% of workers have a shifting work schedule. Almost half of workers in the department of public safety (policemen, firemen) and health care have such a work schedule. The British Trades Union Congress published in 2018 that since 2013 the people who work in shifts have increased with 5%, from which 2/3 are women. According to the International Classification of Sleep Disorders 2-5% of workers have a sleep disorder associated to shift work. People with SWD are at danger of falling asleep involuntary during work or while driving. This has socioeconomic value, due to the increased risk of road and work related accidents, disability and danger to the general public.

Shift work is related to certain chronic diseases. Long-term shift work increases the risk of malignant conditions (of the prostate in men, of the breast in women), cardiovascular and gastrointestinal diseases, metabolic disorders and obesity. These workers often suffer from depression or have problems in their social lives due to them working in inconvenient hours, which can lead to social isolation.

The thesis has a clearly defined research aim, namely to study the quality of sleep and sleep disorders, as well as their effect on the health condition in shift workers. Five research goals are logically formulated.

A total of 100 subjects were included in the study, divided into two groups. First group comprised of 50 workers with a shifting schedule. The second group is comprised of 50 workers with normal working hours (from 9 AM to 5 PM), as a control group.

All the patients underwent detailed clinical and professional history assessment, specialized questionnaire assessment. The following rating scales were performed: Pittsburgh Sleep Quality Index to score the quality of sleep, Insomnia Severity Index to score the severity of insomnia complaints from the last two weeks, Epworth Sleepiness Scale to score the severity of excessive sleepiness during different daily activities. A polysomnography was conducted to all of the participants with a Nox 1 polysomnographic device during their normal sleeping hours.

The results obtained were analyzed with variation, correlation, alternating and graphical analyses and clearly demonstrated in tables and graphics.

Patient's demographic and general data did not differ statistically between groups.

Employees with a shift work regime have a subjectively worse state of health compared to the controls, and in the population studied by us, no increase in the frequency of socially significant diseases was found in the first group compared to the second.

The assessment scales conducted (PSQI, ISI and ESS) show a significantly reduced quality of sleep in employees with a shift work schedule compared to those with normal working hours, with the former having evidence of severe insomnia and excessive sleepiness.

In both groups, with the increase of age, all sleep indicators worsen, and in shift workers this occurs at a significantly earlier age, with the exception of sleep efficiency. In the studied workers, subjective sleep quality was not significantly affected by gender, but higher scores on the PSQI and ESS test rating scales and a higher Apnea-Hypopnea Index (AHI) were found in men.

Shift-work workers had statistically significantly reduced duration, efficiency, latency, and increased awakenings and periodic movements of the lower limbs during sleep compared to those with regular work hours recorded by polysomnography. Apnea-Hypopnea Index-a is not affected by shift work.

Of the occupational factors studied, the shift work statistically significantly affects the studied indicators of sleep. The presence of stress at work affects the number of awakenings from sleep. The presence of a forced work posture and mental work statistically significantly affect the Apnea-Hypopnea Index, and mental work also affects the number of periodic movements of the lower limbs during sleep. Heavy physical work does not affect sleep indicators.

The most important results of the study are summarized and five general conclusions are drawn.

Also six contributions are defined, three with original and three with confirming character, all of them fully acceptable.

Dr. Yankova's study, in my opinion, contributes to both scientific and clinical aspects of the problems discussed.

The abstract of the dissertation is structured according to institutional requirements, corresponded exactly to the main study and is illustrated with ten tables, sixteen figures and five applications.

As a remark I would like to specify the following: the list of Bulgarian studies and authors cited could be substantially enlarged. Also, further publications could be presented in higher ranking scientific journals.

In conclusion, I find Dr. Yankova`s thesis to treat a question of important current interest, interdisciplinary oriented, well structured, and well written. The aim of the study was clearly defined and accomplished. The conclusions directly correspond to the aim and purposes and are useful for clinical practice in both professional diseases and neurology.

All mentioned above gives me the grounds to appeal that the members of the Honorable Jury stand in support of awarding the research doctoral degree Philosophy Doctor to Dr. Aleksandra Krasimirova Yankova- Aleksieva.

Date: 10.Jul.2023
Varna, Bulgaria

Signed: 
Borislav Ivanov M.D., Ph.D.