You are kindly invited to the public defense to obtain the double degree of

DOCTOR OF PSYCHOLOGY (VUB) & DOCTEUR EN SCIENCES PSYCHOLOGIQUES (ULB)

of drs. WINDAL Maxime

Which will take place on **May 13 at 3:30 pm**
Promotiezaal (Building D – room D2.01) – VUB Main Campus Brussels
Pleinlaan 2 – 1050 Brussel
Or if you wish to attend online: **Join the meeting**

LANGUAGE OF THE DEFENSE IS FRENCH

SLEEP AND MENTAL HEALTH IN THE BELGIAN POPULATION DURING THE COVID-19 PANDEMIC: A NETWORK APPROACH

JURY

INTERN:

Prof. dr. Philippe Peigneux (Chair) (ULB)

Prof. dr. Imke Baetens (VUB)

Prof. dr. Giovanni Briganti (ULB)

EXTERN:

Prof. dr. Alexandre Heeren (UCL)

Prof. dr. Christina Schmidt (Ulg)

PROMOTORS

Prof. dr. Olivier Mairesse (VUB)

Prof. dr. Charles Kornreich (ULB)

Prof. dr. Daniel Neu (ULB)

Coming by car? Please register your licence plate in advance to have access to the campus.

You are also invited to the reception afterwards. Please confirm your attendance

before Friday, May 10 via mail: maxime.windal@alumni.umons.ac.be

How to reach the VUB? Click for directions.

SUMMARY

Introduction : The COVID-19 pandemic, deemed a global health emergency between 2020 and 2023, had a significant impact worldwide not only on physical health and mortality, with 3.4 million deaths reported by the WHO, but also on mental health due to the anxiogenic, changing, and novel context in which society was evolving. This thesis aimed to investigate mental health and sleep by means of network analysis. To do so, four studies were carried out, focusing on different cohorts, namely first responders within a hospital population during the first two lockdowns during the COVID-19 pandemic, as well as the general population and finally, shortly after the last confinement an adolescent and young adult population.

Method : Anxiety and depressive symptoms, sleep habits as well as insomnia symptomatology were measured by means of the Generalized Anxiety Disorder 7-item, Patient Health Questionnaire 9-item, and the Insomnia Severity Index. Next to symptom intensities, we systematically investigated the network structure of these symptoms using undirected (Ising and Gaussian Graphical Models (GGMs)) and directed (Bayesian Directed Acyclic Graphs (DAGs)) network analysis in order to reveal mutual and directional dependencies.

Results : First, our findings indicate that frontline workers reported significantly higher anxiety, depression, and insomnia symptom intensities compared to other hospital staff members during the first and fourth waves. However, the disparity in the intensity of these complaints slightly diminished during the fourth wave, occurring more than a year after the first. Secondly, our findings reveal that during the first lockdown, the general population experienced a significant increase in complaints of insomnia, anxiety, and depression, which intensified even further during the second lockdown in Belgium suggesting prolonged impacts on sleep and mental health due to the ongoing pandemic. Finally, our results also demonstrated that sleep habits among the adolescent and young adult population changed during the lockdown compared to the easing down of the containment measures in early 2022. Among them, participants reported advanced bedtime and wake time, as well as a subjectively longer total sleep time, compared to the lockdown periods and regardless of chronotype. This population also showed a slight increase in depressive and anxious symptoms during the lockdowns, while insomnia complaints remained similar.

Network analyses revealed that the network topology (i.e., the relational structure between symptoms) in healthcare workers was not influenced by exposure (i.e. working as a frontline hospital worker or not). Moreover, anxiety seemed to play a pivotal role during the two periods investigated, due to the presence of several anxiety symptoms possessing the highest centrality indices and their locations situated upstream of the DAGs, suggesting that other symptoms are directionally dependent of anxiety and may contribute to the maintenance of other mental health issues. Regarding the general population, it is also noted that this network topology was not significantly influenced by the lockdowns. Furthermore, our analyses reveal that here diurnal symptoms of insomnia have the highest centrality indices and are located at the top of the DAG (whereas they are located towards the end of the cascade in healthcare workers). Finally, the network analysis of the adolescent and young adult population demonstrated that an increase in mental fatigue during the lockdown was among the most central changes in the model, and also appeared as the parent node of the DAG, indicating that the presence of this change implied more the presence of other changes connected to this mental fatigue, rather than the reverse.

Conclusion : In conclusion, this thesis has firstly allowed us to highlight a greater intensity of symptoms of anxiety, depression, and insomnia in frontline workers compared to other hospital professions, but also an intensity of these same symptoms for the general population that was exacerbated by the two lockdowns imposed in Belgium, and especially during the second. The adolescent and young adult population, on the other hand, is characterized by insomnia complaints that were not intensified during the lockdowns, but rather by changing sleep habits during these periods. Secondly, the various network analyses conducted during this thesis highlight the phenomenon that the variables contributing to the intensification of symptoms are not necessarily the same as those that change their interrelational structure. From a therapeutic viewpoint, this underscores an interesting phenomenon of robustness, or resilience, of the relationships present between an individual's complaints, even as an external event intensifies or, conversely, mitigates them. This underlines the importance of personalized therapeutic care that should target for some more the external factor influencing intensity, while for others it will focus more on the internal relationships between the different components of the complaints network. Future research could also look into the evaluation of such personalized care, by collecting longitudinal and personalized data, to later integrate them into temporal network analyses, precisely adapted to causal inferences that would be crucial for the evaluation of this kind of idiographic care.

CURRICULUM VITAE

Diploma

2019-2020 : Master degree in Sciences Psychologiques (UMONS)

Certificate

2018-2019 : Certificat interuniversitaire en Approche pratique et pluridisciplinaire de la physiologie et des pathologies de l'éveil et du sommeil (ULB)

2023-2024 : ICH GOOD CLINICAL PRACTICE E6 (R2), The Global Health Network [Academic year 2324]

2023-2024 : Doctoral training (ULB & VUB)

Research Output

Scientific publications

International peer-reviewed article

Windal M, Roland A, Briganti G, Kornreich C, Mairesse O. Intensity and Network Structure of Insomnia Symptoms and the Role of Mental Health During the First Two Waves of the COVID-19 Pandemic. Nature and Science of Sleep. 2023 Dec 1;15:1003-1017. https://doi.org/10.2147/NSS.S432944

National peer-reviewed article

Roland A, Colomb C, Noël S, Putilov AA, Oginska H, Delwiche B et al. Prevalence of Insomnia and Sleep Habits during the First and Second Wave of COVID-19 in Belgium. Psychologica Belgica. 2023 Feb 21;63(1):18-29. https://doi.org/10.5334/pb.1160

Presentations for academic audience

Poster presentation

- Windal M, Roland A, Mairesse O. Le sommeil des adolescents et jeunes adultes après la pandémie: Effet du chronotype et analyse de réseau des changements dans les habitudes de sommeil. 2023. Poster session presented at Le Congrès du Sommeil - Lille, Lille, France.

- Windal M, Levy S, Bare R, Benoit F, Surquin M, Delwiche B et al. MENTAL HEALTH IN BELGIAN HOSPITAL WORKERS DURING THE FIRST WAVE OF COVID19. 2022. Poster session presented at 26th Congress of the European Sleep Research Society, Athenes, Greece.