CIRCADIAN SYSTEM STATUS AND SLEEP IN WOMEN WITH LOCALIZED BREAST CANCER DURING TREATMENT VS. LONG SURVIVORS.

B. Rodríguez-Morilla[1,2,3], P.F. Almaida-Pagan[2,3], M.J. Martínez-Madrid[1,2,3], M. Torrente[4], B Cantos[4], M Blanco[4], B Nuñez[4], P. Sousa[5], M Provencio[4], J.A.; Madrid[2,3,1], M.A. Rol[2,3,1], M. Campos[2,3,1]

[1]Kronohealth SL, Murcia, Spain; [2]Chronobiology Laboratory, University of Murcia, Murcia, Spain; [3]Ciber Fragilidad y Envejecimiento Saludable (CIBERFES), Instituto de Salud Carlos III, Madrid, Spain; [4]Medical Oncology Department, Hospital Universitario Puerta de Hierro-Majadahonda, Madrid, Spain; [5]Department of Electrical Engineering, NOVA School of Science and Technology, Universidade Nova de Lisboa, Lisbon, Portugal

eSLEEP EUROPE
October 4-6, 2023 | Virtual Congress

kronohealth

BACKGROUND

Sleep disorders are highly prevalent in cancer patients (up to 60%) and commonly associated with circadian disruption[1], with a variety of manifestations such as alterations in the regularity or relative amplitude of the rhythms, or in the sleep timing or duration. Sleep alteration complaints are reported before, during, and after treatment, frequently persisting in the long term. Our aim was to study sleep and circadian rhythms in a group of localized breast cancer patients (LBCP) during treatment and two groups of LBC long survivors (LS).

METHODS

LBCP group (N = 48): undergoing chemotherapy treatment

LS-1 group (N = 17): treatment ended 1-2 years before the study

LS-2 group (N = 27), treatment ended 3 years before.

All patients were being followed at the Oncology Unit of Hospital Universitario Puerta de Hierro Majadahonda.

Each patient was coupled to a free-of-cancer digital twin (same gender, similar age, height and weight). Their rhythms of motor activity, wrist skin temperature, position and light exposure were recorded during 7 consecutive days in free-living conditions through the wearable device Kronowise®. From them, sleep was estimated through the TAP-Keywake® algorithm[2] implemented in https://kronowizard.um.es/ (figure 1).

Circadian and sleep parameters were compared between each LBC group and their control group (CG) through paired T-tests.

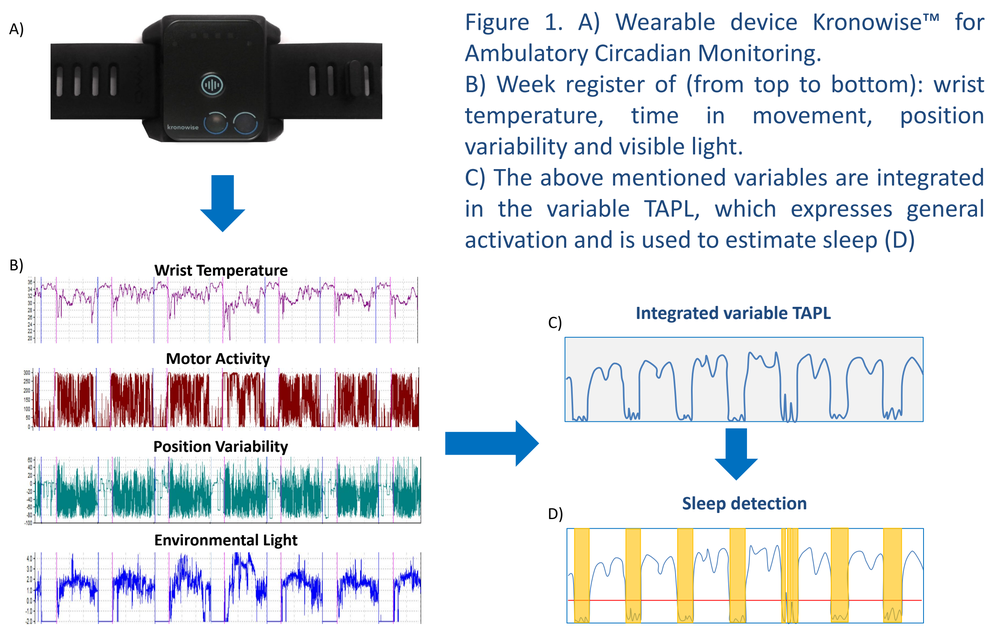

Figure 1. A) Wearable device Kronowise™ for Ambulatory Circadian Monitoring.
B) Week register of (from top to bottom): wrist temperature, time in movement, position variability and visible light.
C) The above mentioned variables are integrated in the variable TAPL, which expresses general activation and is used to estimate sleep (D)

RESULTS

LBCP rhythms were more irregular and delayed ($p < 0.05$) and showed lower relative amplitude ($p = 0.03$) than those of their CG. Graphic representation of their mean circadian rhythms (figure 2) revealed: lower daytime activation (A, $p < 0.01$, B), and more sleep during daytime ($p < 0.01$) (C) in LBCP, and an "aged" circadian pattern of temperature (D), with minimum values in the morning and a progressive increase (indicating physiological deactivation) throughout the rest of the day.

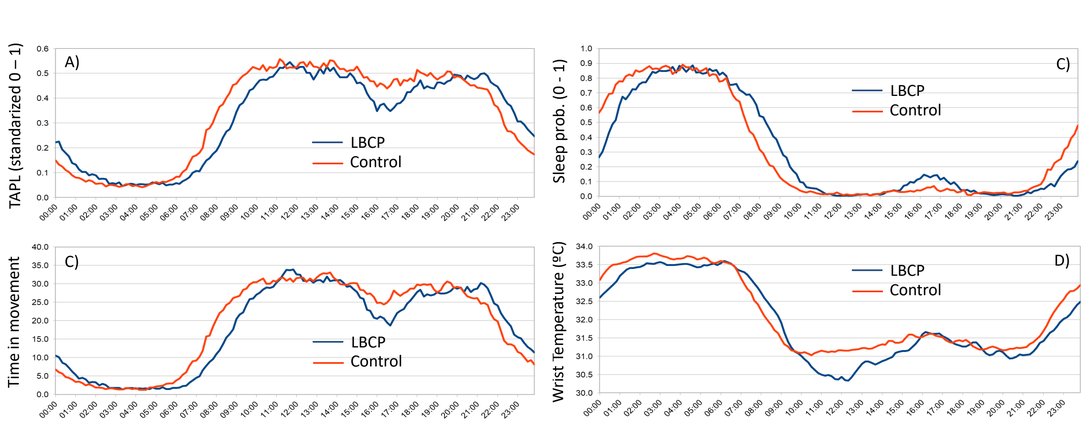

Figure 2: mean circadian waveforms of A) TAPL (general activation), B) time in movement, C) sleep probability, and D) wrist temperature of the LBCP group (blue line) and their control group (orange line). The X axis represents the time of day, from 00 h to 23:59 h.

LS-1 (figure 3) showed more physical activity ($p = 0.04$) (B) and less sleep during daytime (C) so as more sleep efficiency (both $p < 0.05$). Daytime temperature was significantly lower in LS-1 and LS-2 than in their CGs ($p < 0.05$). No other differences were found between LS-2 and their CG (figure 4).

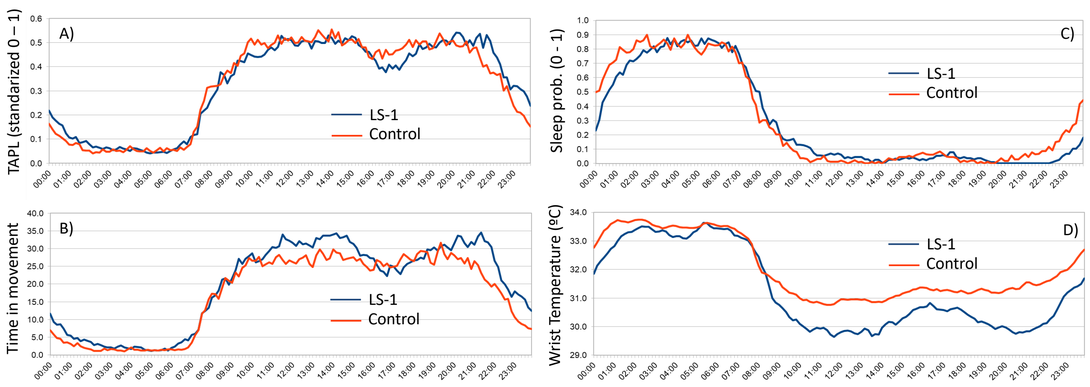

Figure 3: mean circadian waveforms of A) TAPL (general activation), B) time in movement, C) sleep probability, and D) wrist temperature of the LS-1 group (blue line) and their control group (orange line). The X axis represents the time of day, from 00 h to 23:59 h.

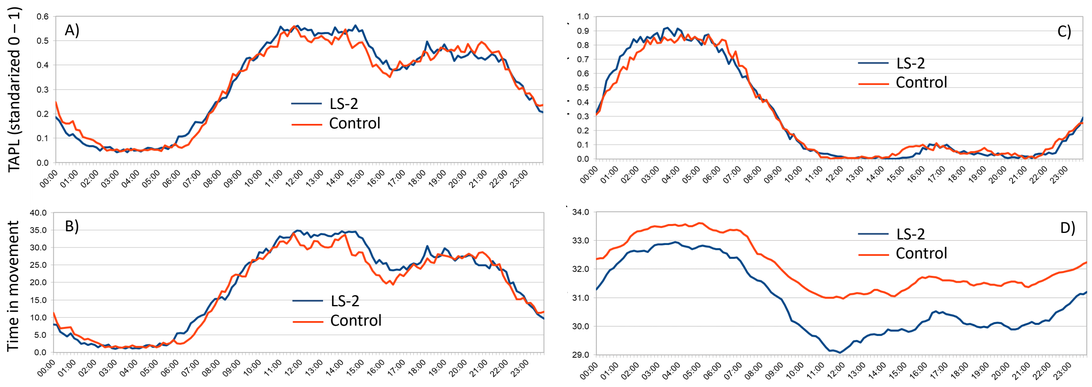

Figure 4: mean circadian waveforms of A) TAPL (general activation), B) time in movement, C) sleep probability, and D) wrist temperature of the LS-2 group (blue line) and their control group (orange line). The X axis represents the time of day, from 00 h to 23:59 h.

CONCLUSION

LBCP showed worse indicators of circadian health than their CG without cancer, but these findings were not replicated in any of the LS groups. Future studies should address long-term evolution of sleep/circadian status in cancer patients during and after treatment through a longitudinal intragroup design.

REFERENCES

1. Almaida-Pagan, P.F., Torrente, M., Campos, M., Provencio, M., Madrid, J.A., Franco, F., Rodríguez-Morilla, B., Cantos, B., Sousa, P.A., Martínez-Madrid, M.J., Pimentao, J. & Rol, M.A. (2022) Chronodisruption and Ambulatory Circadian Monitoring in Cancer Patients: Beyond the Body Clock. Curr Oncol Rep 24, 135–149. https://doi.org/10.1007/s11912-021-01158-z

2. Madrid-Navarro, C. J., Puertas, F. J., Escamilla-Sevilla, F., Campos, M., Abellán, F. R., Rol, M. A., & Madrid, J. A. (2019). Validation of a device for the ambulatory monitoring of sleep patterns: A pilot study on Parkinson's disease. Frontiers in Neurology, 10(APR), 1–15. https://doi.org/10.3389/fneur.2019.00356

ACKNOWLEDGMENTS

This work was supported in part by CLARIFY project, within European Union's Horizon 2020 Research and Innovation Programme under grant agreement No.875160, Instituto de Fomento de la Región de Murcia (INFO) and Instituto de Salud Carlos III through CIBERFES (CB16/10/00239) all co-financed by FEDER.

servicios@kronohealth.com

https://esleepeurope.eu/