

Method Here we use data from the UK Biobank (N=5505, aged from 45 to 73) to elucidate the effect of poor sleep (insomnia, snoring, daytime sleepiness and short sleep duration) on WMH load. The sleep variables were obtained using a digital questionnaire, whereas the WMH load was derived from automated segmentation of T2 FLAIR magnetic resonance images using the BIANCA tool in FSL.

Results We show that age, snoring and daytime sleepiness significantly predict a higher WMH load (linear model, adjusted $R^2=0.13$, $p<0.0001$). The WMH load of patients with potential sleep issues is significantly larger than those who reported no sleep issue (figure 1). Markers of poor sleep are associated with a higher body mass index (BMI) (linear model, adjusted $R^2=0.041$, $p<0.0001$). A small but significant relationship exists between age, BMI and WMH (linear model, adjusted $R^2=0.14$, $p<0.0001$).

Finally, a sleep burden score summing poor sleep markers significantly predicted the WMH load, when controlling for cardiovascular factors (table 1). Removing the sleep burden score leads to a significant decrease in the power of the model (ANOVA, $p=0.027$).

Discussion This exploratory analysis confirms the impact of measures of poor sleep on cerebrovascular health, proposing a complex relationship between sleep and WMH loads involving cardiovascular features^{3 4} in a large ageing population. Further work will examine the wider implications of measures of poor sleep on cognition and brain function.

REFERENCES

1. Debette S, Markus HS. The clinical importance of white matter hyperintensities on brain magnetic resonance imaging: systematic review and meta-analysis. *BMJ* 2010;**341**:c3666.
2. Ju YS, Lucey BP, Holtzman DM. Sleep and Alzheimer disease pathology—a bidirectional relationship. *Nature reviews Neurology* 2014;**10**(2):115.
3. Kocovska D, Cremers LG, Lysen TS, Luik AI, Ikram MA, Vernooij MW, et al. Sleep complaints and cerebral white matter: A prospective bidirectional study. *J Psychiatr Res* 2019;**112**:77–82.
4. Lu S, Song L, Wang D, Zhang X, Lv X, Yin H, et al. White matter hyperintensity and cognitive impairments in chronic insomniacs. *Neuroreport* 2019;**30**(9):612–618.

P039 REM SLEEP AND DREAM REPORTS IN FREQUENT CANNABIS VERSUS NON-CANNABIS USERS

Ceri Bradshaw*, Rebecca Borsok, Matthew Taylor, Sophie Segust, Daniel Ford, Michelle Carr. *Swansea University, Swansea, UK*

10.1136/bmjresp-2019-bssconf.39

Tetrahydrocannabinol (THC; one of the main psychoactive components of cannabis) has been shown to suppress REM sleep¹⁻⁴ and affect sleep latency,^{4 5} although these findings are not consistently replicated.^{3 4 6} Cannabis use is also reported to affect dreaming frequency.⁷ Most studies investigating cannabis use and sleep have been laboratory-based, while only a limited body of research exists on dream occurrence and cannabis use. This study aimed to pilot the measurement of participants sleeping at home in their usual surroundings, in order to assess effects of cannabis use compared to non-use, on objective sleep measures, dream reports, and self-reported anxiety, memory, and sleep quality. Eleven frequent cannabis users versus 8 non-users proceeded in their usual routines, and wore Hypnodyne Zmax portable sleep acquisition headbands (recording EEG, EOG and EMG) while sleeping at home over two consecutive nights. Participants gave dream

reports in three awakenings, set at two-hourly intervals on each night, and once upon morning awakening, reporting dream content and subjective ratings of the dream's bizarreness, emotionality, and sensory experience. In addition, participants completed problem cannabis use, lifetime and nightly cannabis use, PSQI, everyday memory and trait anxiety measures. No differences were reported by participants in sleep quality, anxiety or memory between the two groups; predictably, cannabis users reported significantly more problems in relation to use of the drug. Cannabis users demonstrated significantly longer sleep latency and less REM sleep overall; no other differences occurred in objective sleep measures between groups. Cannabis users reported higher bizarreness in their dreams, but no differences were reported in dream recall or other dream measures. It is noted that small sample sizes limit the generality of findings in this study. The procedure provides a useful paradigm and encouraging initial results, however, for contemporary research related to cannabis use and sleep in naturalistic conditions, in this ongoing project.

REFERENCES

1. Babson K A, Sottile J, Morabito D. Cannabis, cannabinoids, and sleep: a review of the literature. *Current psychiatry reports* 2017;**19**(4):23.
2. Bonn-Miller MO, Babson KA, Vandrey R. Using cannabis to help you sleep: heightened frequency of medical cannabis use among those with PTSD. *Drug and alcohol dependence* 2014;**136**:162–165.
3. Bowles N P, Herzig M X, Shea S A. Recent legalisation of cannabis use: effects on sleep, health, and workplace safety. *Nature and Science of Sleep* 2017;**19**(9):249–51
4. Feinberg I, Jones R, Walker J M, Cavness C, March J. Effects of high dosage delta-9-tetrahydrocannabinol on sleep patterns in man. *Clinical Pharmacology Therapy* 1975;**17**(4):458–66.
5. Karacan I, Fernández-Salas A, Coggins W J, Carter W E, Williams R L, Thornby J I, Villaume J P. Sleep electroencephalographic-electrooculographic characteristics of chronic marijuana users: Part I. *Annals of the New York Academy of Sciences* 1976;**282**(1):348–74.
6. Schierenbeck T, Riemann D, Berger M, Hornyak M. Effect of illicit recreational drugs upon sleep: cocaine, ecstasy and marijuana. *Sleep Medicine Reviews* 2008;**12**(5):381–389.
7. Tassinari CA, Ambrosetto G, Peraita-Adrado MR, Gastaut H. The neuropsychiatric syndrome of 89-tetrahydrocannabinol and cannabis intoxication in naïve subjects. In: Nahas G G, Sutin K M, Harvey D, Agurell S, Pace N, Cancro R. (Eds), *Marijuana and Medicine* 1999 (1st edition 649–664).

P040 ASSOCIATION BETWEEN SLEEP DURATION AND MACRONUTRIENT INTAKE IN PEOPLE WITH TYPE 2 DIABETES

¹Sahar Khodabakhsh*, ¹Clare England, ²Rob Andrews, ¹Laura Johnson. ¹Centre for Exercise, Nutrition and Health Sciences, School for Policy Studies, University of Bristol, Bristol, UK; ²Exeter Medical School, University of Exeter, Exeter, UK

10.1136/bmjresp-2019-bssconf.40

Introduction Diet and sleep duration are both associated with Type 2 Diabetes (T2D). However, the longitudinal associations between macronutrient intake and sleep duration in people with T2D are unknown. We aimed to explore associations over 12 months in the Early-ACTID trial of usual care vs. a diet or diet+ physical activity interventions.¹

Method Diet was assessed using 4-day estimated food diaries and average sleep duration in minutes was computed from self-reported usual sleep and wake times at baseline, 6- and 12-months post-intervention. Associations between percent total energy intake (%TEI) from fat, protein, carbohydrate and sleep duration were assessed using isoenergetic multiple linear regression substitution models, adjusting for TEI, and potential confounders.