

Circadian patterns

Integrative time series analysis: Data from a clinical cross-over study in intermittent fasting

As obesity and type 2 diabetes have a tremendous impact on a public health level, still there are just a few sustainable therapeutic solutions for this epidemic without intake of medications. Although its etiology is mainly attributed to westernized lifestyle still numbers increasing. Problems with recommendations for a healthy lifestyle like exercise and diet fail especially in the long run. Thus, behavioral interventions that are sustainable and can be implemented to one's lifestyle are wanted. Here an interesting form of caloric modification comes into play: intermittent fasting. The idea here is not to restrict one's diet by amount of calories but instead change the interval of caloric intake. This new form is making its round as 16:8 h intermittent fasting. Several studies have already shown that if one restricts calorie intake to 8 hours by maintaining same caloric intake per day has beneficial health impact [1-2].

In a cooperation between German Institute of Human Nutrition (DIFE) and HPI, we will investigate the optimal time interval according to one's individual circadian rhythm. Chronobiological studies have shown that not only the sun has effect of triggering the circadian machinery but also the eating behavior.

In the crossover human study, data from genetically assessed chronotype and longitudinal activity measurement have to be analysed in an integrative manner. Thus, methods for time series analysis and different feature modelling approaches have to be applied in order to better understand underlying mechanisms on a systems level.

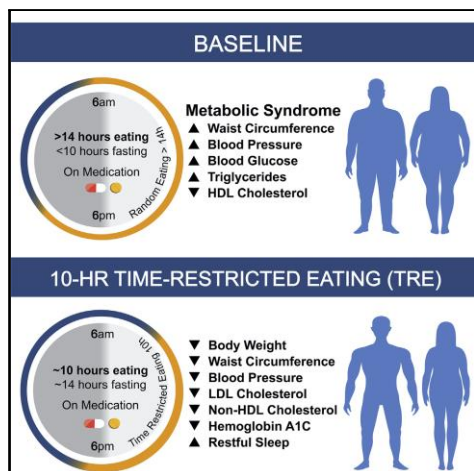


Figure 2: Time restricted eating [1]

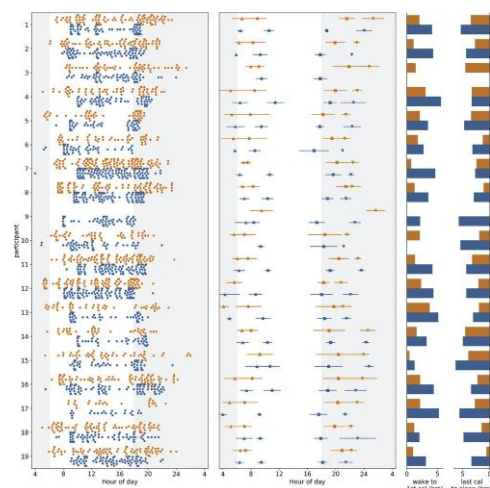


Figure 1: Shift of circadian pattern [1]

Your Responsibilities

- Combining sensor data (continuous glucose monitoring, activity tracking) with biomedical data
- Get acquainted with recent developments in the area of time series analysis (ARIMA, RNN, Bayesian structural time-series models)
- Exploratory time series analysis, visualization and other interpretation concepts and modelling

Your Profile

- Comfortable with data science tools, especially time series analysis (or willing to learn)
- Good programming skills (R, Python)
- Team player and strong communicator
- Self-organisation and adaptive learning
- Good English skills
- Some biomedical knowledge is helpful
- Creative thinking is very welcome

About DIfE

The mission of the German Institute of Human Nutrition Potsdam-Rehbruecke (DIfE) is to conduct experimental and clinical research in the field of nutrition and health. Scientists at the DIfE pursue these scientific goals by interdisciplinary cooperation comprising a broad spectrum of experimental, medical and epidemiological methods. The aim is to understand the molecular basis of nutrition-dependent diseases, and to develop new strategies for prevention, treatment, and nutritional recommendations.

If you are interested in interdisciplinary research, integrative analysis and time series please contact:

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