Impact of Sleep Habit on the Contraceptive Effectiveness of a Fertility Awareness-Based App

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Natural Cycles

INTRODUCTION

- Natural Cycles is a digital fertility awareness-based method (FABM) of contraception cleared by the FDA and certified in the EU. It requires input of basal body temperature (BBT) recordings and dates of menstruation into the app.

OBJECTIVE

- To investigate how sleep pattern impacts the real-world contraceptive effectiveness of Natural Cycles.

METHODS

- Participants were included if they signed up for the app between 01/09/2017 and 31/12/2017.
- Users were split into sub-cohorts based on answers to an in-app question regarding their sleeping habits (Figure 1).
  - Q. What is your usual sleeping pattern?
- 14,583 users were asked the question. 10,712 (74%) replied and were included in the analysis.
- Users were on average 29 years old, in a relationship and had a University degree level of education (Table 1).

Figure 1: Question response and percentage of cohort.

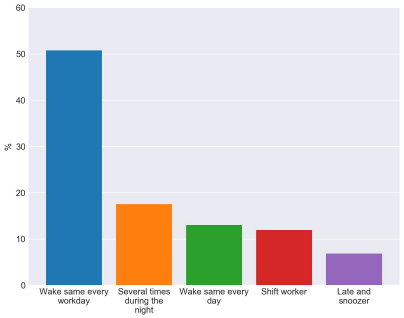


Table 1: Cohort demographics.

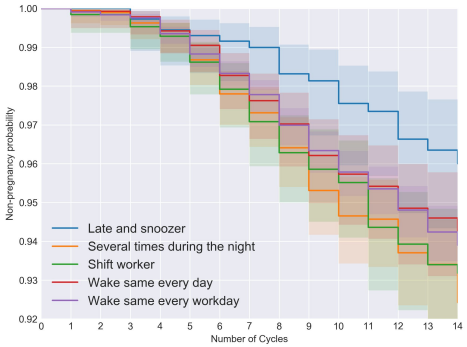
Characteristic	% of cohort
Age (mean)	29.8 ± 5.3
Body Mass Index (mean)	23.3 ± 4.2
Relationship status	
In a relationship	83.4
Single	12.5
Other	4.2
Education level	
University degree or higher	76.8
High School	13.0
Trade/vocational	9.4
Elementary school	0.8

- Typical-use effectiveness was calculated using 13-cycle non-pregnancy probability (Kaplan-Meier).
- Confounding variables were adjusted for using a Cox regression model.

RESULTS

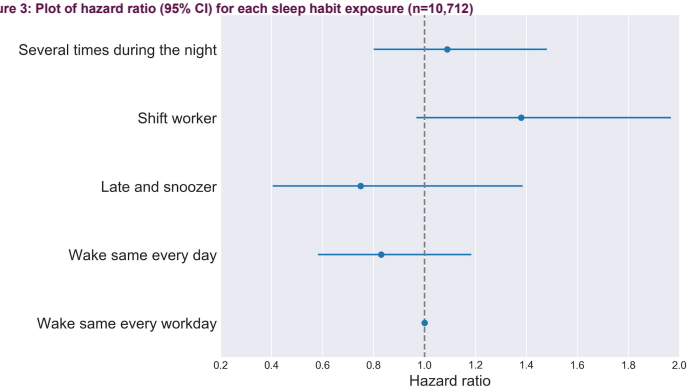
- The majority of respondents reported that they wake at the same time during work days (50.7%).
- Those who reported that they sleep late and snooze had the lowest pregnancy probability (Figure 2).
- All pregnancy probability results are in line with previously published effectiveness estimates. Berglund Scherwitzl et al. Contraception:96, 420-425, 2017.

Figure 2: 13-cycle life table analysis by sleep habit (n=10,712)



- A Cox regression model was applied to the data in order to understand the effect of sleep habit on effectiveness estimates after adjusting for possible confounders.
- The resulting pregnancy rate relative to the 'Wake same every workday' exposure (hazard ratio) is shown for all sleep habit exposures (Figure 3) after adjusting for temperature logging frequency and age. No significant difference in effectiveness was observed between them.
- This suggests that the difference in effectiveness outcomes between sleep habit cohorts can be better explained by population differences in age and behavioral factors among them.

Figure 3: Plot of hazard ratio (95% CI) for each sleep habit exposure (n=10,712)



CONCLUSIONS

- The typical-use effectiveness of Natural Cycles was between 93.4% and 96.3% for cohorts analysed by self-reported sleeping habit.
- When adjusted by age and BBT measuring frequency, no significant difference in effectiveness was observed for different sleep habits.
- Further research is needed to understand how behavioural aspects influence effectiveness rates.

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