Objective

- Using wrist worn wearable sensors, we assessed the differences in temperature, pulse rate, breathing rate and heart rate variability ratio in early pregnancy compared to those of non-conceptive cycle late luteal phase.

Design

- This is an intermediate analysis of a prospective longitudinal observational study conducted at the Clinic for Reproductive Endocrinology at the University Hospital Zurich
- We included healthy, non-pregnant women, between 20 and 40 years old
- Participants self-reported potential behavioral confounders using an electronic diary

Materials and Methods

- Participants wore Ava bracelet (Ava AG, Zürich) daily
- The bracelet measures pulse rate, breathing rate, heart rate variability ratio (LF/HF), and temperature among other physiological parameters
- Day to day activities are known to affect all said physiological parameters, hence, the participants wore the bracelet during sleep, and the parameters were recorded accordingly
- An LH home urine test was used to estimate the ovulation day. The late luteal phase was then defined as ovulation+8 to ovulation+14
- The associations were evaluated using linear mixed effects models with a random intercept and slope for the respective cycle and participant

Results

- We included 44 conception cycles and 467 non-conceptive cycles in the analysis
- In comparison to the late luteal phase of non-conceptive cycles, conception cycles were characterized by:
  - A significant increase in pulse rate (1.1 beats per minute, standard error (SE) 0.3)
  - A higher breathing rate (0.3 breaths per minute, SE 0.05)
  - And a lower heart rate variability ratio (-0.08, SE 0.03)
  - In addition, we observed a 0.07° Celsius decrease in skin temperature, with a SE of 0.004°
- All differences were statistically significant P-value < 0.05

Conclusions

- Current consumer grade wearables are capable of capturing known pregnancy associated physiological changes.
- Our findings could pave the way for the continuous assessment of the occurrence of pregnancy without any effort from the user

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