DIGITAL WOMEN’S HEALTH BASED ON WEARABLES AND BIG DATA

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**a) Introduction**

**Facts**
- 30% of couples have trouble conceiving
- Timing of sexual intercourse is essential as 70% of pregnancies occur in a 3 day window
- Cycle lengths vary by 7 days or more for 47.5%

**Concept**
- Todays tools are not optimal: missing convenience and/or precision
- Idea: Use individual big physiological data for identifying fertile phase
- Startup company located in San Francisco (CA, USA) and Zurich (Switzerland, Europe)

**b) Ava Medical Wearable**

**One device to measure 9 parameters**
- Skin temperature
- Pulse rate
- Heart Rate Variability (HRV)
- Breathing rate
- Sleep (phases, length)
- Movement
- Perfusion
- Bioimpedance
- Heat loss

**c) Clinical Data**
- 41 subjects / 180 menstrual cycles
- March 2015–March 2016
- Single center, retrospective cohort trial
- Included: healthy women between 20 and 40
- Excluded: pathologies and medicine influencing the menstrual cycle
- Conducted at home
- Ethical approval from Ethical commission Canton Zurich (KEK-ZH-Nr: 2015-0018)
- Daily synchronisation
- Urinary LH-tests for evaluating ovulation
- Online survey for documenting confounding parameters

**d) Findings**

- Minimum average resting pulse rate occurs in the follicular phase with 55.5 beats per minute and maximum resting pulse rate in the luteal phase with 59.3 beats per minute
- Wrist skin temperature follows the same pattern with 34.3 degrees Celsius respectively
- Other parameters are currently in evaluation and will be patented and published
- 2 patents were filed by the research team

**e) Algorithm Performance**

- Algorithm detects average 4.6 fertile days per cycle (Sensitivity = 76.7%) while at the same time featuring a robust specificity (91.5%)
- New clinical trial started to optimize algorithms

**f) Summary**

**Conclusions**
- Multiple physiological parameters measured at the wrist can be used for tracking of menstrual cycles
- Pulse rate and skin temperature signals measured at the wrist feature highly significant changes throughout the cycle

**Outlook**
- Further parameters are currently analyzed and will be published soon
- A bigger dataset is currently collected in a 2nd clinical trial with n (subjects) > 200 women
- The used signals can be applied to many more fields in gynecology (pregnancy monitoring, PCOS, menopause, …)

The project team is highly interested in cooperations with global partners in additional research fields in gynecology.