Can likelihood of natural pregnancy be predicted from demographics and LH surge characteristics?

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Background

- There are many factors known to influence the probability of conceiving naturally, such as age, body mass index (BMI), smoking and previous obstetric history.
- Age is a particularly significant factor: a fertile 30-year-old has a 20% chance of conceiving each month, which declines to <5% for a 40-year-old woman.
- Fertility declines during the perimenopause, but onset of the perimenopause is not currently predictable and often not recognisable; in addition, conditions such as polycystic ovary syndrome (PCOS) may influence fertility; these can manifest in disturbances in the luteinising hormone (LH) surge profile.
- Therefore, it is possible that characterisation of the LH surge, along with basic demographic information, could provide important information on the chances of natural conception.

Study objective

- Predicting the likelihood of conceiving naturally could help women who are planning pregnancy.
- This study examined whether demographic information, together with LH surge characteristics, can predict the likelihood of women conceiving naturally.

Methods

- This was a home-based, observational study.
- Trial registration number: NCT01577147

Study population

- Volunteers from the UK seeking to conceive naturally (>18 years old).
- Analysis population; Women who became pregnant (n=185) and an age and fertility-matched group that failed to conceive; endometriosis, 1% versus 4% and PCOS, 11% versus 18% for the pregnant and non-pregnant groups, respectively.

Data collection

- Demographic data was self-reported.
- Volunteers collected daily urine samples for one entire menstrual cycle; urinary LH was measured using AutoDELFIα across the whole cycle.

Analysis

- LH surges were characterised to examine baseline levels, surge day, peak day, peak concentration and magnitude of surge.
- The most accurate description of baseline levels was found to be square root of LH concentration on cycle day 6–15)^2, and description of magnitude was (LH on peak day - LH on surge day)/LH on surge day.

Results

Study population

- Of the 185 pregnancies, 26 miscarried and 149 had ongoing pregnancies.
- Of the 200 non-pregnant volunteers, 26 had no LH surge day (due to varying reasons, including: missing LH samples, anovulatory cycles or atypical LH curves).
- There are many factors known to influence the probability of conceiving naturally, such as age, body mass index (BMI), smoking and previous obstetric history.
- Age is a particularly significant factor: a fertile 30-year-old has a 20% chance of conceiving each month, which declines to <5% for a 40-year-old woman.
- Fertility declines during the perimenopause, but onset of the perimenopause is not currently predictable and often not recognisable; in addition, conditions such as polycystic ovary syndrome (PCOS) may influence fertility; these can manifest in disturbances in the luteinising hormone (LH) surge profile.
- Therefore, it is possible that characterisation of the LH surge, along with basic demographic information, could provide important information on the chances of natural conception.

Association between demographic information and chance of conceiving

- Table 1 provides summary statistics of the impact of demographic variables on the likelihood of conceiving.
- Those who failed to conceive had a higher BMI (non-statistically significant difference) and were more likely to be current smokers.
- The number of months trying to conceive was an extremely significant predictor of pregnancy and the number of previous livebirths also differed significantly between those who did and did not conceive.
- Both self-reported endometriosis and PCOS were more prevalent in the group that failed to conceive; endometriosis, 1% versus 4% and PCOS, 11% versus 18% for the pregnant and non-pregnant groups, respectively.

Table 1. Impact of demographic variables on likelihood of conceiving

<table>
<thead>
<tr>
<th>Variable</th>
<th>Pregnant volunteers</th>
<th>Non-pregnant volunteers</th>
<th>P Value*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean age, years (SD)</td>
<td>30.55 (5.05)</td>
<td>30.57 (5.14)</td>
<td>0.7</td>
</tr>
<tr>
<td>Mean BMI (SD)</td>
<td>26.90 (9.54)</td>
<td>27.91 (6.70)</td>
<td>0.12</td>
</tr>
<tr>
<td>Self-reported average cycle length, days (SD)</td>
<td>29.28 (3.06)</td>
<td>29.84 (3.91)</td>
<td>0.12</td>
</tr>
<tr>
<td>Current smokers</td>
<td>5.4%</td>
<td>10.5%</td>
<td></td>
</tr>
<tr>
<td>Months trying to conceive (SD)</td>
<td>7.72 (8.13)</td>
<td>17.75 (24.19)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Previous livebirths, n (SD)</td>
<td>0.92 (1.04)</td>
<td>0.66 (0.86)</td>
<td>0.01</td>
</tr>
<tr>
<td>Previous miscarriages, n (SD)</td>
<td>0.68 (1.04)</td>
<td>0.70 (1.18)</td>
<td>0.87</td>
</tr>
<tr>
<td>BMI, body mass index, SD, standard deviation.</td>
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</tbody>
</table>

Conclusions

- Base demographics can predict the likelihood of achieving pregnancy; particularly length of time trying to conceive, previous number of pregnancies, BMI and self-reported PCOS/endometriosis.
- LH surges were broadly observed to be similar between both groups, but a steeper LH surge is associated with a higher pregnancy likelihood.
- LH baseline on day 6 is important, with very low or very high levels associated with a lower probability of conception.
- Providing robust information to women on their chances of natural conception can provide them with realistic expectations on their likelihood of success.
- This may be especially valuable to women of an older age who still wish to try for a natural conception, enabling them to make more objective decisions on their path to pregnancy.

References


Study funding / competing interest(s)

The study was funded by SPD Development Company (Bedford, UK), a fully owned subsidiary of SPD Swiss Precision Diagnostics (Zaransa, Switzerland). SW and SJ are employees of SPD Development Company.

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