

THE INFLUENCE OF PHYSIOLOGY AND SEXUAL BEHAVIOR ON SEASONALITY OF CONCEPTION

Ester Rizzi – Univ. Padua (Italy) ester@stat.unipd.it

Gianpiero Dalla Zuanna – Univ. Messina (Italy) gianpidz@hotmail.com

Research items

- Does season influence fecundability in women non affected by nutritional and physic stress?
- If so, what is the intervening role of biological factors and sexual behaviour on seasonality of fecundability?

The data set

(B. Colombo and G. Masarotto, University of Padua - Italy, General Coordinators)

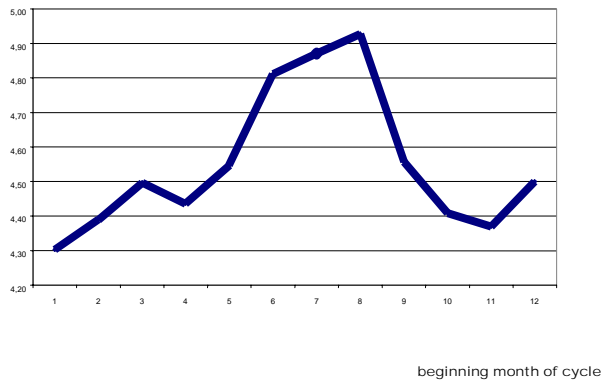
Data comes from 1,074 healthy non-contracepting sexually active couples, living in Belgium, France, Germany, Italy, New Zealand, Switzerland and UK. Information on 10,508 women's cycles is collected. For every cycle we can observe:

- *beginning date (d/m/y) of the cycle (shifted of six months for New Zealand);*
- *number and timing of sexual intercourse;*
- *total length of the cycle;*
- *timing of ovulation (identified by sympto-thermic method or Billings method).*
- *age of women at each cycle.*

Profiles of seasonality (univariate analysis)

Fig1. Seasonality of sexual behavior

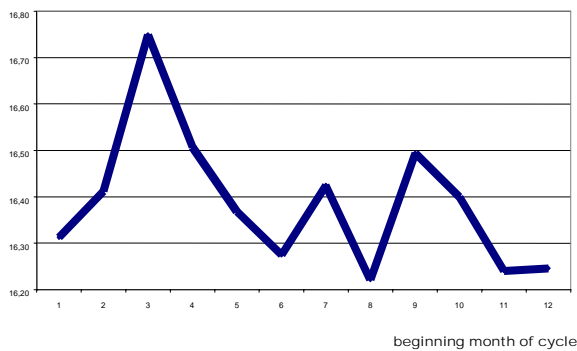
Mean number of sexual intercourse within the cycle



Intercourse episodes are more frequent during the Summer.

Fig2. Seasonality of pre-ovulatory length

Mean length of pre-ovulatory phase of the cycle



Length of pre-ovulatory phase slightly increases in March.

Fig3. Seasonality of fecundability

Fecundability per month(=conception cycles/total no. of cycles)



During April, May and June fecundability is lower. We observe a depression of fecundability also in October and November. Figure (1) and figure (2) lead us to the hypothesis that the first peak (March) in (3) could be related to biology and the second one (August and September) to sexual behaviour.

Event-history logistic regression model (I)

CONCEPTION (0, 1) = dependent variable

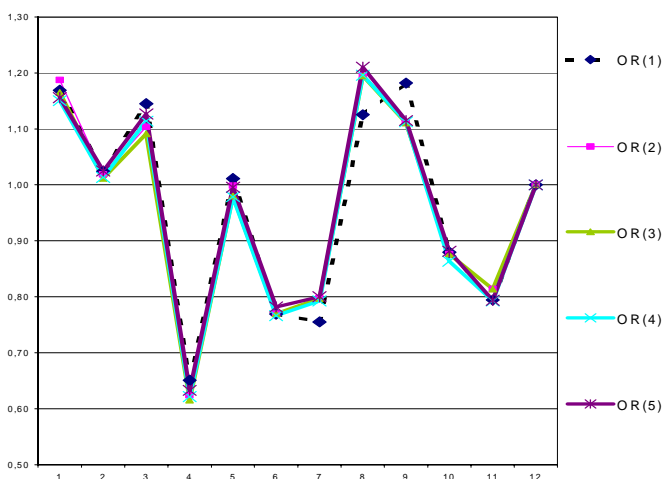
MONTH (1, 2, ... 12) = explanatory variable (categorical)

Other variables are introduced in the model in order to explain the relation of interest: *AGE OF WOMAN*, *PRE-OVULATORY LENGTH*, *PARITY* AND *SEXUAL BEHAVIOUR* (number of acts of intercourse in the fertile window (-4,+1))

Tab1. Estimation of monthly coefficients (OR) for five nested models (reference month=december)

	MODEL (1) - Month - Age of woman - Length of prevov. phase - Parity (0/1) - Number of intercourse	MODEL (2) - Month - Age of woman - Length of prevov. phase - Parity (0/1)	MODEL (3) - Month - Age of woman - Length of prevov. phase	MODEL (4) - Month - Age of woman	MODEL (5) - Month
January	1,16	1,15	1,17	1,19	1,17
February	1,02	1,01	1,01	1,02	1,02
March	1,13	1,11	1,09	1,10	1,14
April	0,63	0,62	0,62	0,62	0,65
May	1,00	0,98	0,98	1,00	1,01
June	0,78	0,77	0,77	0,77	0,77
July	0,80	0,79	0,80	0,80	0,76
August	1,21	1,20	1,20	1,20	1,13
September	1,11	1,11	1,11	1,11	1,18
October	0,88	0,86	0,88	0,88	0,88
November	0,79	0,79	0,81	0,81	0,79
December	1	1	1	1	1

Fig4. Fecundability per month (OR), for five nested models



Accounting for sexual behaviour in the model, the second peak of seasonality (August) shifts towards September.



Event-history logistic regression model (II)

Model controlling for:

A) interaction effects (with interaction term $Month*Age$ and $Month*Preovulatory\ length$)

B) non observed heterogeneity between women (conditional likelihood estimation)

Fig5. Monthly profile of fecundability (OR) at different ages and pre-ovulatory length ≤ 13 days

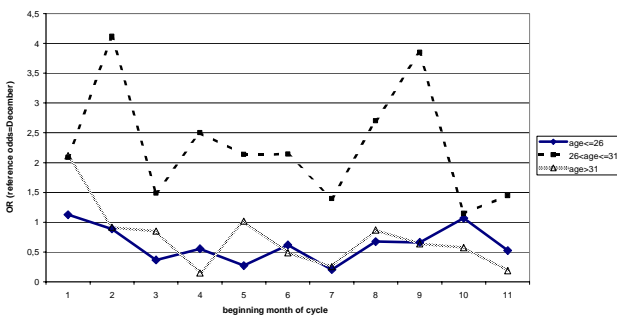


Fig6. Monthly profile of fecundability (OR) at different ages and pre-ovulatory length between 13 and 17 days

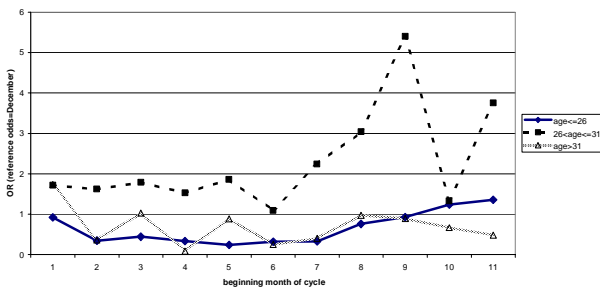
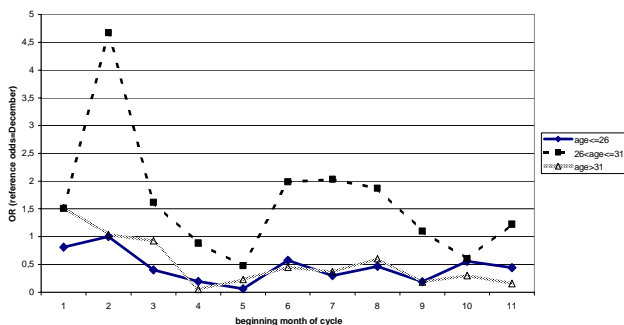


Fig7. Monthly profile of fecundability (OR) at different ages and pre-ovulatory length > 17 days



The group aged 26-31 seems to be more receptive to seasonal effect on fecundability (see difference in OR between monthly peaks and depression of fecundability).

These preliminary results are in accordance with those present in literature on the depressive effect of high temperature.

Further refinement, in method and hypothesis, is needed to explain the nature (the specific intermediate biological causes) of seasonal peaks of fecundability.