

Proposal for Study: Conception Statistics in the Human Female

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1 Introduction

Sperm cells come in two forms: X-chromosome sperm cells and Y-chromosome sperm cells. Fertilisation of the egg by an X sperm cell results in a female foetus while fertilisation by an Y sperm cell results in a male foetus. This paper only introduces the different characteristics of the X and Y sperm cells in the context of lifetime and motility of the X and Y cells.

The assumptions made are:

- Any single act of intercourse would introduce approximately an equal number of X-bearing and Y-bearing sperm cells into the female [1].
- The cells themselves follow a normal distribution. I feel this is a safe assumption as no data exists to say otherwise, and in the absence of a known distribution for (for example) the motility of a sample of XX cells, using a normal distribution is the only sensible option. ¹

The questions are:

- Using the known facts (the motility and the lifespan) of sperm cells, and given a regular menstrual cycle, can we predict what the probability is that intercourse on a certain day would result in the conception of a male offspring, a female offspring, or no conception at all.
- If the predictions assuming a normal distribution deviate from the recorded results, can we assume that the sperm cells do not follow a normal distribution?

This is an excellent opportunity to test the commonly held laymans theory that Y-bearing sperm cells move faster than X-bearing sperm cells but do not survive for as long. Mobile technology is cheap and widely enough deployed

¹Note that cell lifespan and motility is heavily influenced by lifestyle and enironmental factors.

that any female with a significant interest in their cycle² would be interested in monitoring their fertile phases.

2 Lifespan and Motility Sperm Cells

It is known that Y-bearing sperm tend to move with more overall direction than X-bearing sperm [3] in bovines, thereby ensuring a larger overall velocity for the Y-bearing sperm cells. The commonly held hypothesis is that Y-bearing cells move faster than X-bearing cells, but die quicker. I am unable to find a recent study that supports this hypothesis.

The laymans view is that intercourse as close as possible to the day of ovulation would increase the chances of male conception, while conception a few days from the day of ovulation would increase the probability of a female conception. In order to test this a simple-to-use system was developed to allow a self-selected sample of females to record and track their menstrual cycle and the dates of intercourse.

Some data exists which suggest that the motility of X-bearing sperm cells ought to be higher than Y-bearing sperm cells [2]. As [2] indicates a higher zeta potential for X-bearing cells, one would expect that X-bearing cells would have a higher motility than Y-bearing cells, all other factors being equal.

3 Data Capture

The application is developed for cellphone usage. It is developed to be portable to most cellphones and is given with a “*freeware*” licence that encourages wide redistribution. The application itself would transmit the data once a month to a central database, where the data will be stored until further analysis can be done.

The application allows the user to record the first day of the cycle, present the user with a projected 28-day clock that displays with a single needle the current time of the users cycle. The clock is shaded green, pink and blue. The green pie slice represents days when conception is unlikely, the pink pie slice represents the days when conception favours a female and the blue represents those days when conception favours a male.

The obvious disadvantages are if the user of the application neglects to record every instance of intercourse, or records the incorrect day as the start of the cycle, or even has a cycle that deviates from the standard due to illness or health reasons. Such deviations or neglect would likely record incorrect data.

One way to overcome such problems in ensuring data purity is to have two separate databases that store the information, and ask woman currently visiting infertility clinics or requesting contraceptives to become subjects. These woman

²Either interested in conception, conception of a specific gender or in no conception at all (i.e. “*The Rhythm Method*” of contraceptives widely espoused by a number of theologically-based viewpoints).

would presumably be more interested in their cycle and would thus be more diligent about ensuring they enter the correct data in.

The other datastore can be used to store the data from the application that is given “out in the wild” so to speak, as then meaningful comparisons can be drawn between the two samples.

4 Conclusion

As the “market” for conceiving babies, conceiving gender-specific babies and preventing conception is huge, it is feasible that given sufficient awareness-raising of the effort to collect this data, that the developed application would be redistributed far and wide, ensuring that a large number of subjects are available.

Financially, the data collection ought to cost very little. The analyses would not doubt provide insight into other fields (how many woman are actively trying for a boy, how many for a girl, etc) for very little cost, and the effort can be scaled up at any time for very little cost and effort should a larger sample be required.

References

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