

Menopause evolved to prevent competition between mother and daughter-in-law, researchers say

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The menopause evolved, in part, to prevent competition between a mother and her new daughter-in-law, according to research published today in the journal *Ecology Letters*.

The study – by researchers from the University of Turku (Finland), University of Exeter (UK), University of Sheffield (UK) and Stanford University (US) – explains for the first time why the relationship [women](#) had with their daughter-in-laws could have played a key role.

The data showed that a grandmother having a baby later in life, and at the same time as her daughter-in-law, resulted in the newborns of each being 50 per cent less likely to survive to adulthood.

The analysis helps to solve one of nature's great mysteries: why female humans, unlike most other animals, stop reproducing so early in life.

It also adds weight to the theory that the menopause evolved to allow women to focus on their grandchildren. Traditionally, this role included providing food for the family and protecting young children from accidents and disease.

The topic has rarely been analysed, because it requires detailed data on the reproductive success of several generations of women, with knowledge on who lived with whom and when. Scientists analysed

200-years' worth of data collected by Dr Virpi Lummaa of the University of Sheffield and her student Mirkka Lahdenperä of Turku University, Finland, from church registers of pre-industrial Finland. They looked at information on birth and death rates from 1700 to 1900, before the advent of modern contraception or healthcare.

The study reveals that women had more grandchildren if they stopped reproducing around the age of 50. The research team believes this was partly because of reduced competition between the older woman and her daughter-in-law and partly because of the support she could offer her grandchildren.

A child born to families with a mother-in-law and daughter-in-law reproducing simultaneously was twice as likely to die before reaching the age of 15. However, this was not the case in the instances when a mother and daughter had babies at the same time. This suggests that related women breed cooperatively and unrelated women breed conflictually.

There is a clear biological benefit to a woman cooperating with her daughter: the women share 50 per cent of the same genes so being in competition for food and other resources makes little sense. This is not the case for a mother-in-law and daughter-in-law: they are not related, so it is logical they should compete to maximise on their chances of spreading their genes.

Consequently, the Finnish data shows that the average woman would benefit from stopping reproducing at the age of 51 if she risked breeding with her daughter-in-law, but not her daughter.

Different theories have been put forward for the evolution of the menopause in humans, including the idea that it evolved to protect older women against the danger of dying during pregnancy or childbirth.

However, under two per cent of the pre-industrial Finns in this study died in childbirth in their mid-40s, and such risks of dying in childbirth are similarly low in hunter-gatherers today.

Co-author Dr Andy Russell from the University of Exeter's Centre for Ecology and Conservation said: "We are so used to the fact that all women will experience menopause, that we forget it is seriously bizarre. Evolutionary theory expects animals to reproduce throughout their lifespan, and this is exactly what happens in almost every animal known, including human men. So why are women so different? Our study shows for the first time that the answer could lie in the relationship between a mother-in-law and daughter-in-law."

Dr Virpi Lummaa, from the University of Sheffield's Department of Animal and Plant Sciences, said: "The research adds weight to the argument that menopause evolved because of the vital role that grandmothers played in rearing grandchildren in traditional societies. Although family roles have changed, many grandmothers still play a vital role in caring for their grandchildren and in western society a large number provide daycare. It is interesting that even today, mothers rarely choose to have children at the same time as their offspring: even if they have not yet been through the [menopause](#)."

Provided by University of Exeter

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