The importance of grandmothers in the lives of their grandchildren

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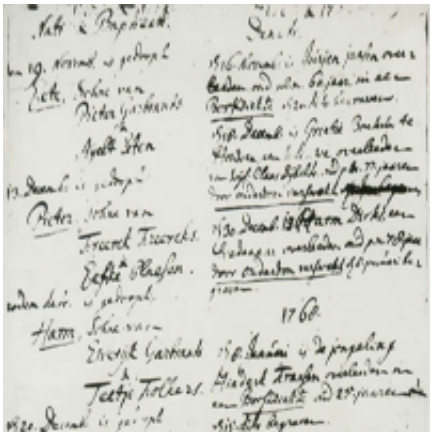

(PhysOrg.com) -- It is widely believed that women live long post-reproductive lives to help care for their grandchildren. According to the "Grandmother Hypothesis," post-menopausal women can increase their genetic contribution to future generations by increasing the survivorship of their grandchildren.

While some demographic studies have found evidence for this theory, others have found little support for it.

A team led by biological anthropologist Leslie Knapp in the Department of Biological Anthropology have discovered that a grandmother's effect on grandchildren varies according to their X-chromosome relatedness.

The research was carried out by a re-evaluation of the birth and death records of seven populations in Asia, North America, Europe and Africa who had lived in different periods dating back to the 17th century.

By specifically looking at child mortality in the first three years of life it was found that a grandmothers' effect on grandchildren varies according to their X-chromosome relatedness.

It was discovered that the effect of a grandmother's presence on grandchild survivorship corresponds relatively with her X-relatedness to the grandchild, which is not equivalent in boys and girls.

Specifically, maternal grandmothers have 25% X relatedness with both grandsons and granddaughters and both grandchildren are equally likely to inherit any one of her X-linked genes.

Contrastingly, paternal grandmothers will pass on one of her X chromosomes to their granddaughters (making them 50% X-related) but she will not pass this chromosome on to her grandson (making them 0% X-related).

Molly Fox, Gates Cambridge Scholar at the Department of Biological Anthropology said : "We suggest that maternal and paternal grandmothers have different incentive to invest in grandsons and granddaughters, due to differences in genetic relatedness.

"The presence of a paternal grandmother in all seven of the populations had a harmful effect on grandsons because her presence was linked with an increase in mortality.

"Meanwhile, in six out of seven populations, the paternal grandmother's presence in her granddaughter's early life had a beneficial effect in terms of the risk of mortality. This difference between paternal grandsons and

granddaughters would explain a lot of the inconsistencies in previous studies, where the sex of the grandchild was not considered.

"We've only looked at child mortality, and the mechanism itself remains mysterious. Other studies have given evidence against conscious favouritism towards one grandchild or another".

It is widely believed that women live long post-reproductive lives to help care for their grandchildren and the "Grandmother Hypothesis" is based on the fact that women are genetically related to their grandchildren.The results suggest that the nature of that genetic relatedness should not be overlooked since boys and girls differ in the percent of genes they share with maternal versus paternal grandmothers based on differences in X-chromosome inheritance.

Biologists use genetic relatedness between family members to explain the evolution of not only longevity, but also altruism, kin investment, offspring recognition, parenting strategies, and tribe formation, and so reconsidering the genetic relatedness between grandmothers and grandchildren has implications throughout the field of human evolution.

Provided by University of Cambridge (news : web)