At a household level, how did sibling's death affect index child's mortality?

Infant mortality in Tana parish in the period 1750-1918

Introduction

The Norwegian demographic development during most of the 19th century was dominated by a decreasing infant mortality, and this decrease became even stronger after the turn of the century. Such a corresponding decrease never took place in Tana. From mid 1800 until the beginning of 20th century, the national infant mortality was reduced by 50 per cent. In Tana it was 4 per cent, and the average infant mortality for this period was 13 per cent.

In this study the aim is to test how sibling's death affected individual child's mortality as I posit that household as a unit had a decisive impact on infant's mortality. Not only households may allocate comparable resources and cares among children but children born to the same mothers may also share similar genetic characteristics thereby affecting their risks of dying.

Data, method and variables

By linking information from the baptism and burial records, I have constructed household units with information about the household's fertility history and the story about the children dying before reaching one year. The index child has been right censored if he or she lived through one-year-old birthday, or being considered as a 'failure' case if death occurred before age one. Since one of my objective is to investigate whether preceding sibling's death affected index child's risk of dying during the infancy, households without any child, and households with only one child, have been excluded from the sample. I have used the Cox regression with cluster control at the household level.

Table: Descriptions of Variables used in the Proportional Hazard Model

Variable	No. indv	No. house- holds	Percent- age	Mean	Std. Dev	Min	Max
Tana households	5025	1125					
Sex (1=male)			50.6				
Parity				3.46	2.42	2	17
Previous sibling dead as infant(1=yes)			9.2	0.09	0.29		
Illegitimacy (1=yes)			4.8	0.04	0.21		

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Data digitized by Norwegian Historical Data Center at Tromsø and Bardufoss

Komsekula

Hypothesis

The mortality of the index child is intra-correlated with immediate preceding sibling's death.

Table 1: Hazard of infant death, Tana Parish 1750-1918. With cluster controlled at the household level.

|	Hazard ratio	Robust SE	P> |z|
Sibling's mortality			
Previous sibling dead as infant	2.006	0.233	0.000
Index Child Characteristics			
Parity	0.922	0.042	0.077
Parity, squared	1.008	0.003	0.040
Illegitimacy	1.506	0.242	0.011
Sex	1.099	0.089	0.239

Note: I am well aware of the possible effects of parent's characteristics, such as mother's age, her death and her birth intervals. These data has not yet been linked to the database, but hopefully it will be in the future. In addition, controlling for variables such as occupational status and ethnicity would also be of interest.

Results and Conclusion

In order to estimate the underlying household frailty on index child's death I have chosen to use the immediately preceding sibling's death.

. The result in table 1 shows that the death of the prior immediate sibling significantly increased the index child's risk of dying by 100 per cent.

Figure: Smoothed Hazard Estimates of Index Child's Mortality
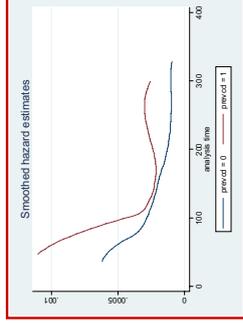
. This graph shows the different mortality hazard for index child with the effect of whether or not immediate sibling died. Here you can clearly see that the effect is more or less diminishing after approximately the 3 first month of life, slightly increasing after six month.

I have not been able to indicate if having more siblings dying during infancy was associated with an increased hazard of index child's death. This because of a correlation between the previous sibling's death and the total number of sibling's dying before index child.

Was the hazard of being born as first child the same as being born as number 2, 3, 4 and so forth? In addition to analyse the parity I have added the square term of the parity that allows the relationship between the hazard of death and parity to be non-linear.

. My results suggest, with a p-value of 0.07, that higher parity decreased the hazard – meaning that the earliest born in a family experienced higher risk of dying than their siblings. In addition, the results (weakly) suggest as parity gets really high that the hazard actually started going up again.

The characteristics of the index child did matter.

. Compared to their female counterpart, male infants had 10% higher hazard of mortality, though not significantly. This may be seen as a normal distribution between the sexes due to genetic causes.

. Compared to legitimate children, children baptized as illegitimate faced 50% higher hazard of dying, significant at 0.011.

How come, when clustering on household level, and by excluding all households with only one child, we still get a significant higher hazard for illegitimate infants? Is it possible that families with illegitimately born children, in this context understood as the 'result of carelessness', had some common features that resulted in a higher hazard for the index child?

Is the infant death clustering in the households?

Reference

Hilde L. Jåstad (2007), 'Is the infant death clustering in the households? Infant mortality in Tana parish in the period 1750-1918'. Paper presented at 32th Meeting of The Social Science History Association, November 15-18 2007, Chicago.