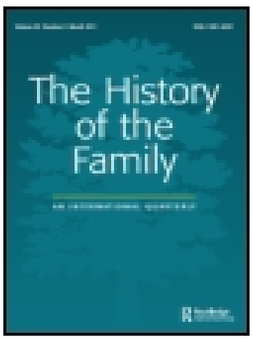

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The effect of parental loss on child survival in nineteenth century rural Estonia

Hannaliis Jaadla [a,b] and Kersti Lust [a]

[a]Estonian Institute for Population Studies, Tallinn University, Tallinn, Estonia; [b]Cambridge Group for the History of Population and Social Structure, Dept of Geography, University of Cambridge, Cambridge, UK

ABSTRACT

This article explores the impact of parental loss and subsequent remarriage on child survival in the nineteenth century, by drawing on the example of post-emancipation rural Estonia. We utilize a novel, individual-level longitudinal dataset combining data from parish registers, poll-tax lists and migrant listings from 1826 to 1891, to examine: (1) how parental loss effects were differentiated by the gender of the parent; (2) if the loss of parents could be compensated by remarriage; (3) how parental loss effects were felt differently by the socioeconomic status of the household. Our results indicate that the effects of parental loss in this setting played in distinctive ways compared to those found in existing literature examining these processes in historical populations. Consistent with the literature, we find that parental loss effects were stronger when mothers died, but unlike other settings, these effects were felt longer in the Estonian setting and even among children aged 5–9 years. Also, paternal loss was associated with elevated mortality, especially among early childhood. We found no evidence to support the idea that remarriage for mothers improved survival prospects for children. However, there is clear support for improving prospects for children with the remarriage of fathers. When it comes to child health outcomes, stepmothers were not as 'evil' as they have been depicted in Estonian folklore, although the resources in families were generally limited and stepchildren might have been discriminated against in the resource allocation within the household.

KEYWORDS

Mortality; parental loss; socio-economic status; East-Central Europe

1. Introduction

In historical contexts, the division of labour and roles in families and households guided the demands and expectations of mothers and fathers. These distinctive roles implied that the effect of losing a parent was also differentially felt by children based on the gender of the parent. As indicators of living conditions, data on the mortality of children have been considered of great importance (Oris et al., 2004; Van Poppel, 2000). There is a small but slowly growing number of studies of historical populations based on individual-level data that show that the loss of the mother substantially affected survival probabilities for children, at least in their early years of life, while the effect of paternal

CONTACT Hannaliis Jaadla hj309@cam.ac.uk

loss was either modest or in some cases even non-existent (Andersson et al., 1996; Beekink et al., 1999, 2002; Campbell & Lee, 2002; Pavard et al., 2005; Reher & González-Quiñones, 2003; Van Poppel, 2000; Willführ, 2009; Willführ & Gagnon, 2013).

Parental loss has been hypothesized to affect child survival through direct influences, such as the loss of parental care and contagion of diseases, or through indirect influences, such as changes in living arrangements and socioeconomic conditions. In the context of each of these pathways, the mother's importance for her child's health was likely to be more salient for direct investments in the child's early life as mothers were responsible for feeding and nurturing children, nursing the child when ill, and maintaining the household's living standards (Reher & González-Quiñones, 2003; Sear & Mace, 2008). Existing studies indicate that the effects of these interventions decreased with age, but in many settings, did not really disappear from a child's life even after the child had reached the age of 10 (Pavard et al., 2005; Reher & González-Quiñones, 2003). Nevertheless, the detrimental effect of maternal loss was strongest during the first year of life, with mortality risk in the post-neonatal period being primarily associated with the lack of adequate feeding and care (Fox et al., 2017). In early childhood, maternal loss was likely to be associated with the loss of maternal health care and for children of older ages (5–10 years), an inadequate education regarding the child's self-care is likely to have played a role in the poor survival chances of children. In addition to heterogeneity in the effects of maternal loss by age of the child, the literature also suggests that these effects may have varied over time. For example, a study on the town of Aranjuez in Spain found that the effect of maternal loss in early childhood (up to age 9) was stronger in the period of rapidly declining mortality than in the pre-transitional period (Reher & González-Quiñones, 2003). In Aranjuez, the effects of maternal loss on the survival of children over two years of age became noticeable only at the time of demographic transition. Reher and González-Quiñones interpreted these results as suggesting the growing importance of the role of maternal education and the empowerment of women in affecting health outcomes as the transition proceeded.

In contrast to the consistent findings for the role of mothers, paternal loss either had no or only modest effects on child survival (Reher & González-Quiñones, 2003; Sear & Mace, 2008; Van Poppel, 2000). Paternal loss is hypothesized to influence the survival of a child through indirect mechanisms because the father was not usually the primary caregiver of his children. The father was normally the main breadwinner of the family and in agricultural societies the death of the father could seriously worsen the economic circumstances of the family. This could lead to lower nutritional levels, to the shift of mother's labour away from child care and house maintenance to paid work, to earlier entry of children into the labour force, and therefore possibly to more risky lifestyles at an early age. Previous studies in both rural and urban historical settings have shown that the father's death had a modest effect on survival chances for children at an early age and this survival disadvantage further decreased with the child's age (Reher & González-Quiñones, 2003; Van Poppel, 2000; Willführ, 2009; Willführ & Gagnon, 2013). In a study from Alghero, however, the effect continued to be felt into early adolescence (Breschi & Mazzoni, 2019). A study in the nineteenth-century Dutch town Woerden has established that if there was an association between the death of the father and the death of the child, this relationship was more likely to have been caused by mortality crisis that killed family members

simultaneously (such as infectious disease) rather than a causal effect of the loss of the father (Beekink et al., 2002).

Studies from different settings have produced diverging results on the stepmother's impact on her stepchildren's survival. It has been found for Sundsvall and Linköping in Sweden and Woerden in the Netherlands that stepparents had a positive influence on the survival of the children (Andersson et al., 1996; Beekink et al., 2002). A comparative study of Krummhörn and Québec has determined that the effect of the remarriage of the surviving spouse was population-specific: in Krummhörn, the father's remarriage and the birth of half-siblings clearly reduced the survival chances of the children born from his former marriage, while paternal remarriage was a more or less neutral event in Québec (Willführ & Gagnon, 2013). In Krummhörn, girls who lived with a stepmother faced increased mortality risk almost as high as right after the loss of their mother; boys' mortality also increased, especially if stepsiblings joined the family with the stepmother. These population-specific effects have been interpreted in light of the availability of resources on which families depended. In the Krummhörn region with few possibilities for spatial and demographic expansion, full and half-siblings competed for limited resources and stepchildren could be discriminated against in the resource allocation within the household. The St Lawrence Valley in Québec, with its quasi-unlimited opportunities for expansion, by contrast, had weak potential for discrimination against stepchildren.

Building on a burgeoning literature, this article explores the impact of parental loss and subsequent remarriage on child survival in a historical setting – Estonia located in East-Central Europe – that has received almost no attention in this regard (see, e.g., Tymicki, 2009). This part of Europe, including nowadays Estonia, was characterized by the prolonged existence of a manorial system (limited and regulated land supply), large share of multiple family households, and the predominance of viri- or patrilocal family formation systems. Drawing on a novel individual-level longitudinal dataset combining parish registers, poll-tax lists and listings of migrants, we examine how parental loss effects vary with the gender of the parents and the possible compensatory role played by step-parents on child survival in this rural, nineteenth-century population. In line with previous research, we expect the health of the children to suffer with the absence of parents. Estonian folklore is rife with bleak pictures of the lives of motherless children (Tedre, 1970). Motherless children suffered from emotional loss, overburdening with work and poor diets. The lyrics of archaic runic songs often contrast the kind treatment by one's own mother with the evilness of the stepmother (Laugaste, 1989, pp. 621–623; Tampere et al., 2003; Mirov & Tuvi, 2009, pp. 361–366). Loss of the mother was seen as inducing a much more devastating impact on the family than the loss of the father:

> When the father dies from the home/Half of the home dies/When the mother dies from the home/The home is dead and gone. (Laugaste, 1986, p. 220)

We expect that mother's death substantially increased her child's risk of death but, following from existing studies, we hypothesize that this effect decreased with age. We also expect to find the negative effect of paternal loss in early childhood as during childhood mortality becomes more sensitive to standard of living.

Our data allow us to shed light on socioeconomic heterogeneity in parental loss effects and track remarriage to explore dynamics linked to step-parental influence. In Estonia,

young children of the landless group exhibited a higher risk of death than those of farmers (Klesment & Lust, 2021). Among landless groups, the father's material contribution was of great importance for the family's and especially children's well-being, and thus, we assume that the disadvantage of paternal loss would be greater for landless children. Thereafter, we study whether the father's remarriage, which was common in rural Estonia, reduced the survival chances of the children born from his earlier marriages. We hypothesize that father's remarriage could affect landless children, whereas in farmers' families, the power of a new farm wife was balanced by the other kin. In farmers' families, it was common for three generations to share living space and the kinship structure of the farmstead population was diverse. The limited size of our dataset does not allow us to study the effect of the birth of half-siblings. The study seeks to expand our knowledge about the effects of parental loss in an understudied context, thereby addressing the question of whether the effects of parental loss as described in the literature are of a universal nature. Our data further enable us to examine factors that were specific to the ecological and cultural context of the population that shaped parental loss effects, and how these varied by sub-groups.

2. Area

The area of our study includes seven adjacent communities (or manors) in the parish of Helme and one in the parish of Paistu in Viljandi County in southern Estonia (see Figure 1). The 1834 poll-tax list (or 'soul revision') provides us with an enumeration of that year's population, comprising 4,704 persons in the seven communities in Helme, and 2,550 in Holstre in Paistu. In the second half of the nineteenth-century Estonia experienced the onset of the demographic transition and the study area was at the forefront in this respect. In Viljandi County, encompassing our study area, crude death rates fluctuated between 23 and 30 per 1000 in 1811–1860 and between 19 and 22 per 1000 in 1861–1900 (Vahtre, 1985, p. 239). There was at least one identifiable episode of famine in the region, taking place in 1844–1846. The infant mortality rate rose by one-fifth and early childhood mortality doubled in those years. In the study area, the mortality rates for all age groups declined largely simultaneously and the mortality risk for infants decreased by 66%, from approximately 250 to 150 per thousand, between 1834 and 1891 (Klesment & Lust, 2021). Early childhood (1–4) mortality reduced by half. Declining mortality helped to trigger the fertility transition, which started in the 1870s–1880s.

The area studied has been described in great detail earlier, and here it is sufficient to mention that it was a rural area that experienced a capitalist transformation, as well as increasing social stratification during the nineteenth century (Klesment & Lust, 2021; Lust, 2021). The population was divided into three broad categories: farmers with large and medium-sized farms; the semi-landless (cottagers) and landless (grouped together as labourers); and skilled workers and retired recruits (categorized as 'other' in our study). During the period covered by the study, tenant farmers became freeholders and the social divide between the landed and landless groups of the peasant population became clear as moving socially up from the status of landless to the status of a farmer became very uncommon. The semi-landless and landless groups comprised roughly two-thirds of the study population. The land supply was fixed and labour supply abundant. The large share of landlessness was rooted in the high concentration of land in the hands of Baltic German

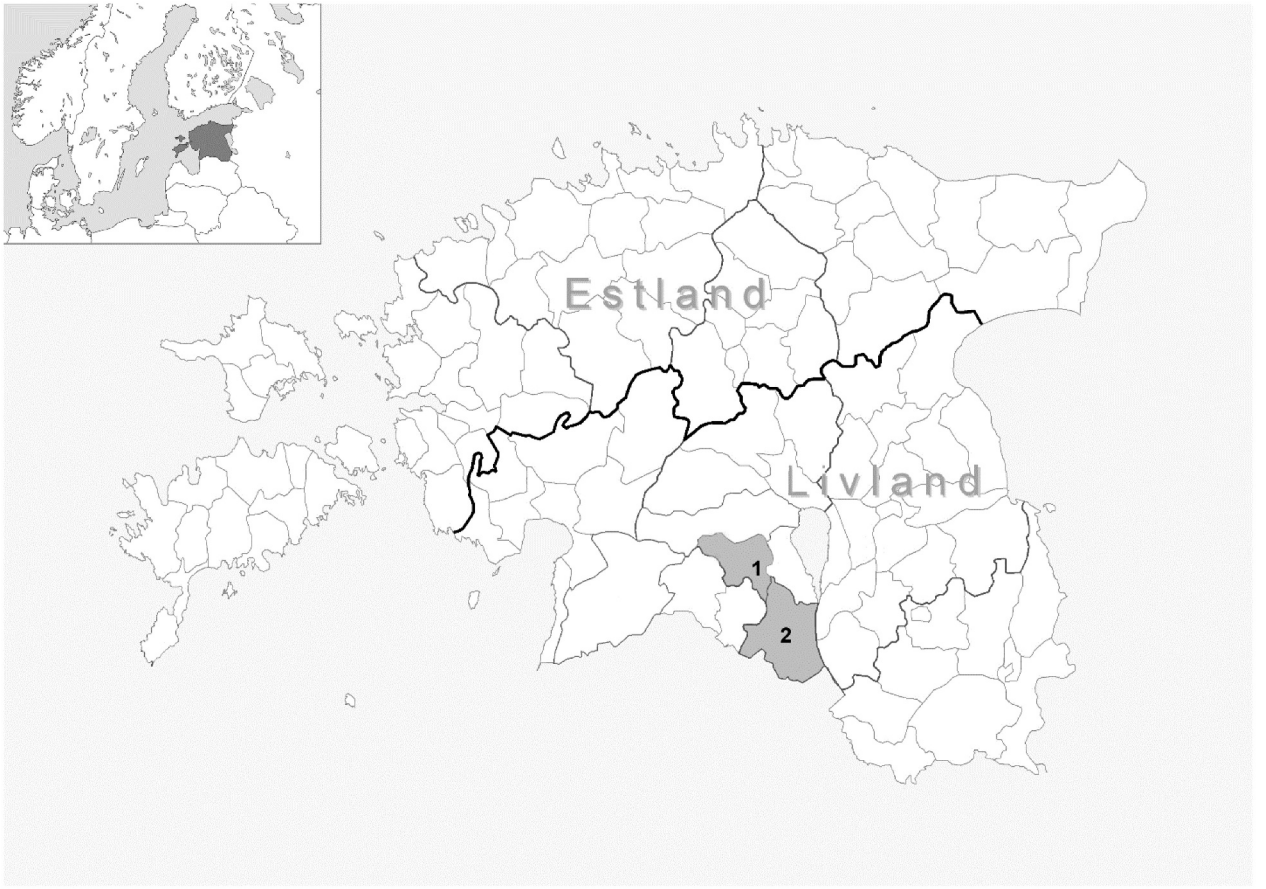

Figure 1. Map of Estonia, the two parishes included in the study are highlighted in grey, Paistu (Holstre)[1] and Helme[2]. Mapped by Kersti Siitan; GIS: Historical Administrative boarders of Estonia (1999). The map shows parish borders and the borders of the governorates of Estland and Livland in 1897.

nobles and the under-development of other sectors of the economy like industry and service. In 1863 and 1897, the percentage of the urban population that was Estonian was only 8.7 and 19.2, respectively.

Until the last decades of the nineteenth century, considerable differences existed across manorial types in Estonia. The parish of Helme comprised multiple privately owned noble manors and one church estate, whereas Holstre was a large state estate. Previous work has highlighted that the legal and economic conditions of peasants in state-owned manors were considerably better than in noble and church manors. Accordingly, infant and childhood mortality was lower on Holstre state estate (Klesment & Lust, 2021). In the context of the current study, differences in the size and composition of the farmstead population would be most relevant as the size and co-residence of other kin probably affected the vulnerability of children and families at the time of parental loss. Unfortunately, there are no time-variant data on household size and co-residence with other kin. However, cross-sectional types of data from census years indicate that multiple-family farmsteads predominated the area and the mean size of the farmstead population was large and the kinship and generational structure diverse (Lust, 2021). The farms on Holstre state estate were permanent, which meant that they were normally passed from father to son over decades. Labourers' families also lived on the same farmstead for decades. On Holstre state estate, farmhands, cottagers and farmers were often related by blood or marriage, which was much more seldom the case in the parish of Helme. Only in the last decades of the century, the number of related and unrelated individuals among the farmstead's population decreased. Given the better economic conditions, higher permanence of farms, larger farmsteads (see Lust, 2021, Table 1) and the higher presence of kin in the households in Holstre we expect that parental loss had somewhat less detrimental effect in Holstre that in the parish of Helme.

3. Data and methods

In this study, we make use of individual-level data from parish registers, poll-tax lists and listings of migrants to estimate the influence of parental loss and remarriage on child survival in the first 9 years of the child's life. The analysis period of our study is determined by the availability of surnames and information about socio-economic status in the parish registers. That means we are able to include in our analysis children born from 1826 (or 1834 in Holstre parish) until 1891. The 1834 poll-tax list (or 'soul revision') provides us with the 'initial' dataset of the full population in the area, including information about individual socio-economic status, age and family relationships. We have linked all births from Lutheran and Russian Orthodox parish registers in the area until the end date of our study (31 December 1891) to the poll-tax list of 1834. In addition to birth records, people who migrated in or out of the community are recovered from migrant listings, parish member registers and church certificates, which include time of arrival or departure and the date of birth or the age of the migrant. These sources were used to determine the population under observation over the period. In this combined dataset, information about the time of death was linked from parish registers. As a result, we can follow each child from birth until death or out-migration. We also generated linked family demographic histories for each child, where parents' marriages (including remarriages) and deaths are exactly known in order to follow their survival status relative to the survival status of the child.

Table 1. Descriptive statistics infant and childhood mortality, Helme and Holstre 1826–1891.

	Infant mortality (29–364 days)		Early childhood mortality (1–4 years)		Childhood mortality (5–9 years)	
	# obs.	# deaths (%)	# obs.	# deaths (%)	# obs.	# deaths (%)
Sex						
Male	7,697	1,149 (.15)	6,134	901 (.15)	4,561	212 (.05)
Female	7,565	985 (.13)	6,153	928 (.15)	4,581	204 (.04)
Mother's age						
<20	298	42 (.14)	249	46 (.18)	173	6 (.03)
20–24	3,056	470 (.15)	2,424	327 (.14)	1,839	74 (.04)
25–29	4,098	506 (.12)	3,344	477 (.14)	2,477	110 (.04)
30–34	3,645	523 (.14)	2,914	454 (.16)	2,140	116 (.05)
35–39	2,652	355 (.13)	2,147	323 (.15)	1,628	71 (.04)
40+	1,513	238 (.16)	1,209	202 (.17)	885	39 (.04)
SES						
Farmer	4,942	712 (.14)	4,019	590 (.15)	3,131	123 (.04)
Labourers (landless)	9,302	1,284 (.14)	7,448	1,145 (.15)	5,413	276 (.05)
Other	1,018	138 (.14)	820	94 (.11)	598	17 (.03)
Birth cohort						
1826–1839	2,978	455 (.15)	2,514	405 (.16)	2,042	129 (.06)
1840–1849	2,503	390 (.16)	2,098	404 (.19)	1,616	105 (.07)
1850–1859	2,361	363 (.15)	1,977	307 (.16)	1,533	53 (.03)
1860–1869	2,551	328 (.13)	2,185	264 (.12)	1,780	53 (.03)
1870–1879	2,557	320 (.13)	2,228	299 (.13)	1,807	59 (.03)
1880–1891	2,312	278 (.12)	1,285	150 (.12)	364	17 (.05)
Parental status						
Parents alive	15,073	2,105 (.14)	11,507	1,762 (.15)	8,345	385 (.05)
Father died	124	10 (.08)	502	41 (.08)	480	13 (.03)
Mother died	64	19 (.41)	254	23 (.09)	287	17 (.06)
Both parents died	1	0 (.00)	24	3 (.13)	30	1 (.03)
Parish						
Helme	11,520	1,717 (.15)	9,142	1,420 (.16)	6,680	288 (.04)
Holstre	3,742	417 (.11)	3,145	409 (.13)	2,462	128 (.05)
TOTAL	15,262	2,134 (.14)	12,287	1,829 (.15)	9,142	416 (.05)

Registers of Lutheran parish members, which contain data on births, migratory moves, marriages and deaths of all family members in the same locale, were used to assess the results of the linked dataset.

To identify the influence of parental loss on infant and childhood mortality, we used event history analysis, where survival time was measured from the date of birth until their death or time of censoring (out-migration or age 9),[1] if this occurred before. In total, we follow 15,262 births during our observation period from 1826 to 1891 (shown in Table 1). Stillborn children, twin births, and all children who died during the first month of their life (<29 days) were excluded from the analysis. Following previous studies with similar research aims by Pavard et al. (2005) and Willführ and Gagnon (2013), survival in the first month was not included because deaths at the very early ages were less likely to be related to parental investments and rather determined by maternal health, gestational conditions and complications during delivery (Clark et al., 2008). We estimated the same set of Cox proportional hazard models for three age groups (29–364 days, 1–4 years and 5–9 years). Parental status was included as a time-varying variable and was defined in four categories: (a) both parents alive, (b) father dies, (c) mother dies, or (d) both parents die during the observation period. The influence of parental remarriage on child survival was estimated in a separate set of models, where the time of exposure starts after the loss of mother or father. During the observation period (29 days to 9 years), 626 children

experienced maternal loss and 1,076 paternal loss, with 78% of fathers remarrying and only 15% of mother's remarrying in the same time frame. The main reasons why we observe more paternal than maternal deaths are due to sex- and age-related differences in survivorship. As expected, women tended to live longer than men. The remaining life expectancy at age 30 for women was two to three years longer for women than for men in Helme and Holstre during the nineteenth century.[2] Furthermore, fathers were also often much older as they were more likely to remarry, and the average spousal age gap in Helme and Holstre during the period was of 4 years. In the parental remarriage models, parental status was again included as a time-varying variable but with only two categories. In the mother's remarriage model, the variables take the following form: (a) only mother alive, or (b) mother remarries, and in the father's remarriage model: (a) only father alive, or (b) father remarries. Our analysis was conducted using STATA 15 software.

Table 1 reports the distributions of births and deaths for parental status and other variables of interest in our sample. There were all together 4,379 deaths in the first 9 years of life. In addition to parental status, we include a number of demographic and socioeconomic control variables in the models. Previous research has established the importance of various demographic factors on child survival in historical context. Here, we include the sex of the child, birth cohort and maternal age at birth. The effect of parental loss can also be dependent on parental socioeconomic standing, where higher social status can mean lower exposure to health impacting factors and better access and availability of food, clothing, bedding and housing (Beekink et al., 2002). The majority of fathers in our sample were landless labourers and cottagers (60%) and most other children were born to farmers' families (33%). Out of all births during the observation period, 75% were from Helme parish.

Even in the nineteenth-century setting, parental loss was a rare occurrence. Most children in our sample, who had survived their first 29 days, were raised, at least in infancy in the post-neonatal period, in families where both parents were alive (98.7%). In the first year of life, only 1% of children lost their father and less than 1% experienced maternal loss.[3] In early childhood (1–4 years), these had, respectively, increased to 4% and 2% and in ages between 5 and 9, almost 5% of children had lost their father and another 3% had lost their mother. Except for infants, these figures are lower than has been previously reported in other historical settings around this time, such as in Alghero (Italy) between 1866 and 1935 (Breschi & Mazzoni, 2019, Figure 2). Only very few children lost both of their parents, 24 children in early childhood and 30 in later childhood (5–9 years).

4. Results

Table 2 presents the results for the full sample in three age groups (29–364 days, 1–4 years and 5–9 years). As expected, we find that maternal loss is associated with increased mortality across childhood; however, the effect is age-dependent. Children who had lost their mother in the first year of life had death risks almost 7 times (Hazard ratio (HR) 7.399) higher than children living in families with both parents. Between ages 1–4 and 5–9 years, the hazard ratios decreased, respectively, to 1.5 and 2.9 but remained still statistically significantly above 1, demonstrating that the negative impact of maternal loss persisted throughout the first 9 years of life. Further analyses indicate that children who

experienced maternal loss, especially in infancy, usually died within a month after the mother's death.

We also find support for the negative effect of paternal loss on childhood survival. Children who had lost their father between ages 1–4 experienced 1.4 times higher risk of death than children who had two surviving parents. There was no statistically significant effect of paternal loss in infancy or at older ages. Similarly, orphans experienced higher death risks than children in families with both parents alive, 3.1 times higher risk in early childhood.

In line with previous findings, we find that birth cohorts had a strong impact on mortality rates, with declining mortality rates from the 1860s onwards in infancy and early childhood mortality and the 1850s onwards between ages 5–9 (Klesment & Lust, 2021).[4] Similar to Jaadla et al. (2020), we find that the socio-economic status of the father was associated with mortality but that this effect on survival was age-dependent. Having a labourer father compared to being born to a farmer's family was associated with survival disadvantage in early childhood (ages 1–4, HR: 1.099) and also later in childhood (ages 5–9, HR: 1.319) but not in infancy, thereby coinciding with the time in the life course when mortality becomes more sensitive to standard of living and material resources. Furthermore, our results indicate that infant and childhood survivorship considerably differed in the two parishes, children born in Holstre experienced lower mortality risks in infancy and early childhood but somewhat higher risks in later childhood.

In order to explore whether the type of manor played a role in the effect of parental loss on childhood, we conducted an analysis of mortality by estimating separate models for our two parishes. The results from these disaggregated models are presented in Table 3. Overall, the effect of maternal loss on childhood survival remains consistent across both settings. Losing a mother in childhood was associated with considerable survival disadvantages in nineteenth-century Estonian rural communities. However, our parish-level results indicate that paternal loss in early childhood in Holstre was associated with a strong negative impact on survival (HR: 2.254) which is contrary to our expectations. There is no indication that larger farmsteads and in general higher presence of other kin and better overall economic conditions in Holstre could have compensated for the detrimental effect of losing a father at a young age.

The findings for other variables in Table 3 suggest that mortality improvements in infancy and early childhood started earlier in Holstre parish (among birth cohorts from the 1850s) than in Helme. Whereas, in Helme, the cohorts born in the 1850s experienced improvements only in childhood mortality (between ages 5–9) and a decade later in younger age groups. The effect of the socio-economic status of the family on childhood survival is evident only in Helme, where labourers' children have higher death risks than farmers' children between ages 1 to 9.

We further explored whether the effects of parental loss on survival were dependent on parental socioeconomic standing. Table 4 shows the results for models stratified by paternal socio-economic status and three age-groups. The main effects of parental loss hold for both farmers' and labourers' children. Maternal loss again was associated with a strong negative effect on childhood mortality. In contrast, paternal loss did not show a statistically significant effect on childhood survival in most model specifications. Surprisingly, paternal loss in early childhood was associated with a statistically significant negative impact on survival among farmers' children (ages 1–4, HR: 1.713). It might be

Table 2. Hazard ratios of parental loss in Helme and Holstre, 1826–1891.

	Infant mortality (29–364 days)	Early childhood mortality (1–4 years)	Childhood mortality (5–9 years)
Sex (ref. Male)			
Female	0.866**	1.022	0.961
	(.038)	(.049)	(.094)
Mother's age (ref. 30–34)			
<20	0.990	1.187	0.659
	(.161)	(.190)	(.281)
20–24	1.074	0.854*	0.751†
	(.071)	(.063)	(.114)
25–29	0.853*	0.898	0.825
	(.054)	(.060)	(.113)
35–39	0.944	0.962	0.824
	(.068)	(.071)	(.128)
40+	1.150†	1.103	0.837
	(.092)	(.093)	(.159)
SES (ref. Farmer)			
Labourers (landless)	0.982	1.099†	1.319*
	(.051)	(.058)	(.145)
Other	0.991	0.839	0.827
	(.103)	(.093)	(.233)
Birth cohort (ref. 1826–1839)			
1840–1849	1.044	1.248**	0.996
	(.073)	(.092)	(.135)
1850–1859	1.043	1.014	0.528***
	(.077)	(.079)	(.088)
1860–1869	0.836*	0.754***	0.479***
	(.065)	(.061)	(.079)
1870–1879	0.802**	0.846*	0.520***
	(.061)	(.067)	(.084)
1880–1891	0.764**	0.719**	0.744
	(.062)	(.071)	(.191)
Parental status (ref. Parents alive)			
Father died	1.379	1.358†	1.341
	(.438)	(.223)	(.385)
Mother died	7.399***	1.453†	2.851***
	(1.853)	(.324)	(.764)
Both parents died	–	3.145*	2.406
		(1.812)	(2.417)
Parish (ref. Helme)			
Holstre	0.714***	0.795***	1.229†
	(.042)	(.047)	(.139)
N individuals	15,262	12,287	9,142
N failures	2,134	1,829	416
Prob > chi	0.000	0.000	0.000

Proportional hazards assumption checked using Schoenfeld residuals. Model standard errors (in parentheses) clustered at family-level. † $p \leq 0.10$; * $p \leq 0.05$; ** $p \leq 0.01$; *** $p \leq 0.001$.

explained either by falling into the ranks of landless and semi-landless (cottagers) and respective changes in the household living arrangements (it was more often the case on noble manors), or by the growing burden of a widowed farm wife as a (temporary) head of the farm (before remarriage). The increasing role of farm management might have restricted maternal investment in child care. However, all the other hazard ratios of paternal loss were in the expected direction, indicating that losing a father was associated with survival disadvantages in early and late childhood, however it was clearly not of greater importance among landless groups.

Table 3. Hazard ratios of parental loss in Helme and Holstre, 1826–1891.

	Helme			Holstre		
	29–364 days	1–4 years	5–9 years	29–364 days	1–4 years	5–9 years
SES (ref. Farmer)						
Labourers (landless)	0.998	1.164*	1.308*	0.895	0.858	1.334
	(.070)	(.069)	(.168)	(.104)	(.093)	(.280)
Other	0.927	0.791†	0.887	1.301	1.030	0.616
	(.110)	(.105)	(.280)	(.283)	(.221)	(.378)
Birth cohort (ref. 1826–1839)						
1840–1849	1.029	1.313**	1.033	1.017	0.924	0.900
	(.082)	(.111)	(.165)	(.162)	(.134)	(.214)
1850–1859	1.124	1.005	0.698*	0.753	0.668*	0.261***
	(.090)	(.087)	(.128)	(.136)	(.108)	(.092)
1860–1869	0.863†	0.803*	0.512***	0.696†	0.515***	0.407**
	(.074)	(.070)	(.100)	(.130)	(.090)	(.123)
1870–1879	0.816*	0.898	0.540***	0.709†	0.510***	0.477**
	(.068)	(.079)	(.103)	(.136)	(.093)	(.138)
1880–1891	0.763**	0.813†	0.469†	0.744	0.437***	1.215
	(.069)	(.088)	(.182)	(.138)	(.100)	(.442)
Parental status (ref. Parents alive)						
Father died	1.621	1.114	1.561	–	2.254**	0.930
	(.518)	(.229)	(.512)		(.642)	(.546)
Mother died	7.481***	1.201	2.739**	7.542***	3.093**	3.239*
	(2.091)	(.332)	(.873)	(4.272)	(1.194)	(1.615)
Both parents died	–	2.952	3.309	–	3.944†	–
		(2.146)	(3.353)		(3.110)	
N individuals	11,520	9,142	6,680	3,742	3,145	2,462
N failures	1,717	1,420	288	417	409	128
Prob > chi	0.000	0.000	0.000	0.000	0.000	0.000

Proportional hazards assumption checked using Schoenfeld residuals. Models include controls for sex of the child and mother's age. Model standard errors (in parentheses) clustered at family-level. † $p \leq 0.10$; * $p \leq 0.05$; ** $p \leq 0.01$; *** $p \leq 0.001$.

Table 4. Hazard ratios by socioeconomic status on parental loss in Helme and Holstre, 1826–1891.

	Farmers			Labourers (landless)		
	29–364 days	1–4 years	5–9 years	29–364 days	1–4 years	5–9 years
Parental status (ref. Parents alive)						
Father died	1.486	1.713†	1.646	1.429	1.300	1.286
	(.877)	(.477)	(.873)	(.542)	(.278)	(.439)
Mother died	7.528***	1.003	2.630†	6.628***	1.822*	2.845***
	(3.373)	(.421)	(1.380)	(2.159)	(.519)	(.931)
Both parents died	–	2.537	–	–	2.151	3.735
		(2.725)			(2.104)	(3.766)
N individuals	4,942	4,019	3,131	9,302	7,448	5,413
N failures	712	590	123	1,284	1,145	276
Prob > chi	0.000	0.000	0.000	0.000	0.000	0.000

Proportional hazards assumption checked using Schoenfeld residuals. Models include controls for sex of the child, birth cohort and mother's age. Model standard errors (in parentheses) clustered at family-level.
† p ≤ 0.10; * p ≤ 0.05; ** p ≤ 0.01; *** p ≤ 0.001.

Table 5 demonstrates the effect of parental remarriage on child survivorship. Due to the relatively small number of events, we have estimated these models for all children between age of 29 days to 9 years and will refrain from comparisons at different stages of childhood. Interestingly, our results indicate a strong positive effect of father's remarriage on survival in childhood. Children's survival was significantly improved with the introduction of a stepmother, especially among farmer's children. Furthermore, models stratified by the sex of the child indicate that daughters benefitted more from a new stepmother (for girls, HR: 0.319**, for boys, HR: 0.999) while there were no clear differences for survival of sons and daughters with the introduction of new stepfather in the family. Mother's remarriage, also a much rarer event, appeared to be more neutral overall with no statistically significant effect on children's mortality.

5. Conclusions and discussion

In line with earlier studies, we find that the death of the mother was strongly associated with higher child mortality in nineteenth-century Estonia. 36% of infants who lost their mother in the post-neonatal period did not survive their first year of life. For infants, the risk of death increased by 7 times relative to children for whom both parents were alive. The magnitude of the effect that we observe in this setting is stronger than that established for other historical settings with

Table 5. Hazard ratios on parental remarriage in Helme and Holstre, 1826–1891.

	29 days–9 years			29 days–9 years		
	All	Farmers	Labourers (landless)	All	Farmers	Labourers (landless)
Parental status (ref. Only father alive)						
Father remarries	0.516**	0.480†	0.626			
	(.131)	(.212)	(.213)			
Parental status (ref. Only mother alive)						
Mother remarries				0.926	1.032	1.001
				(.316)	(.479)	(.501)
N individuals	626	213	375	1,076	315	705
N failures	115	36	71	110	32	74
Prob > chi	0.009	0.559	0.012	0.399	0.336	0.000

Proportional hazards assumption checked using Schoenfeld residuals. Models include controls for sex of the child, birth cohort, mother's age, and parish. Model standard errors (in parentheses) clustered at family-level.
† p ≤ 0.10; * p ≤ 0.05; ** p ≤ 0.01; *** p ≤ 0.001.

comparable levels of infant and childhood mortality. However, it is somewhat similar to estimates based on Krummhörn region in the period 1720–1874, where maternal loss was associated with 5 times higher infant mortality (Fox et al., 2017). The negative effect of maternal loss was especially strong when children were most likely to be breastfed but also persisted to older ages. Breast-feeding was prolonged and general in nineteenth-century Estonian villages and, as expected, its cessation had devastating effects on the child's survival (Ligi, 1993, p. 7). Although the hazard ratio markedly decreased with the age of the child, there was still a strong negative effect of maternal loss on childhood survival between the ages 5 to 9 compared with families where both parents were alive. The persistence of this negative effect to later childhood is puzzling in light of the existing literature on historical populations, where these effects weaken considerably within this age group (e.g., Andersson et al., 1996; Beekink et al., 2002; Pavard et al., 2005; Reher & González-Quiñones, 2003). One obvious mechanism could have been the direct influence of maternal death on child survival through infectious diseases and epidemic outbreaks. In 1844–1846, dysentery and smallpox simultaneously affected mothers and children, who often died of the same diseases within a short span of each other. In other years, where generalized disease outbreaks were not ongoing, the lack of maternal care is likely to have played an important role in explaining our findings. The Estonian countryside was characterized by high rates of intergenerational co-residence and in the study area, in particular, households were large and complex. When the mother died, there was a grandmother, another relative or at least a farm maid available to step in to provide childcare. Nevertheless, our striking and consistent findings about maternal loss, even across socio-economic groups, suggest that mothers played a crucial role, which were not easily compensated by social standing or other kin members, even if they were likely to be available.

With regard to maternal loss in different types of manors, we find that the effects on infant and childhood survival remain consistent across our two settings. Children in Helme parish were no more vulnerable to maternal loss than in Holstre. This is surprising, in the context, where overall conditions for peasants on state estates like Holstre were better during the nineteenth century and with considerably lower infant and childhood mortality (Klesment & Lust, 2021). Furthermore, in Holstre farmhands and farmers were more often relatives and therefore could possibly more easily provide support at a time of familial hardship. This was much more seldom the case in Helme.

We found some evidence for a negative effect of paternal loss on early childhood. A statistically significant negative effect of paternal loss was detected only for children between ages 1–4 in Holstre parish. Contrary to our expectations, the negative effect was stronger for farmers' children than for labourers' offspring although father's material contribution was very difficult to replace in landless families. Large and medium-sized farms that dominated the study area could rather easily compensate for the loss of the male head of the farm by hiring servants. Our findings about the negative effect of paternal loss in early childhood suggest that father's role might be context specific but children raised in landless families were not exposed to higher risk of death than those from farmers' families.

Earlier studies have shown that the effect of the mother's remarriage was population specific, i.e. modulated by structural and environmental conditions (Willführ & Gagnon, 2013). In our study area, the mother's remarriage generally had a neutral effect on child survival. Children with stepfathers were no better off than fatherless children and these

differences had no clear socio-economic patterns. Previous work has shown that women in Helme and Holstre parishes, who had lost their husbands, had a relatively low propensity to remarry (Lust, 2021). In addition to family and community-level constraints, a lack of beneficial impact of widow's remarriage on their child health outcomes could have also influenced the probability of remarriage for women.

Estonian data seem to point to the fact that father's remarriage and entry of stepmother in the family improved the survival chances of the children born from his earlier marriages. This supports previous findings in the context of the Netherlands and Sweden (Andersson et al., 1996; Beekink et al., 2002). However, our main results seem to differ from what has been found for the Krummhörn region in East Frisia, although the socio-economic context – scarcity of resources (land) and low income – should have probably made the Estonian experience similar to it (Willführ & Gagnon, 2013). Our analysis instead indicates that stepmothers had a strong beneficial effect on stepchildren's survival. In sum, when it comes to child health outcomes, stepmothers were not as 'evil' as they have been depicted in Estonian folklore, although stepchildren often were discriminated against in the resource allocation within the household and burdened with a higher workload as they grew older (Laugaste, 1989; Mirov & Tuvi, 2009; Tampere et al., 2003). It was common that children from the age of five or six worked as herders, assisted with the housework, and helped in the fields.

The 'good' stepmother effect slightly differed when we compare the two main socio-economic groups in the Estonian countryside. Father's remarriage had a clearer positive effect on survival for children born to farmers' families than for landless labourers' families. On the one hand, it is somewhat surprising, as most labourers had no other adult women in the household to complete the female tasks in a clearly gendered division of labour in families. The farm head, by contrast, could rely on aid (work) from all the members of the farmstead. On the other hand, stepmothers entering a farmer's family probably had little chance to be 'evil' towards her stepchildren. In farmers' families, the power of a new farm wife was balanced by the other kin in the household. The inheritance rights (including succession right) of the children born to the first marriage were effectively secured by the law. Furthermore, resources were less limited in farmers' families than in farm labourers' families and therefore, we assume, there was less potential for discrimination against stepchildren. While in landless families, stepmothers were more likely to be heavily overburdened with work. Differently from farmers' wives, they could not easily rely on the help provided by other farmstead members (as they were not subordinate to her). It is fair to assume that the high workload of new wives in farm labourers' families could have influenced the quality of child care provision.

In conclusion, our results show that the negative effect of parental loss on the child survival was longer in Estonia, and the adaptation of the surviving parent and children to a new situation is more difficult than it has often been shown in other historical settings. The presence of kin in the same household or community was commonplace in our study area, and this raises the question of the universal beneficial effect of the wider kin network on the survival of children, having lost either mother or father. Unfortunately, the data limitations do not allow us to fully capture the role of other household members and kin networks on child survival in this context.

Notes

1. Around 1% of children out-migrate with their families in infancy, up to age 5 over 5% of children out-migrate and by age 9 about 8% of children from the starting population have experienced an out-migration event.
2. Our own estimations indicate that in 1834–54 and 1855–74, remaining life expectancy at age 30 in Helme and Holstre was 27 and 34 years for women, and 25 and 31 years for men, respectively.
3. However, in the first month of life (up to 29 days) almost 5% of children lost their mother in Holstre and Helme parishes over this time period. Paternal loss was experienced by 1% of neonates.
4. In further analyses, stratifying by two time periods (results not shown in the paper), we find that the negative effect of maternal loss did not change over our observation period, although the infant and early childhood mortality declined considerably in Helme and Holstre from the 1850s–1860s onwards.

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ORCID

Hannaliis Jaadla http://orcid.org/0000-0002-8569-347X
Kersti Lust http://orcid.org/0000-0003-0384-5722

References

Andersson, T., Högberg, U., & Åkerman, S. (1996). Survival of orphans in 19th century Sweden—the importance of remarriages. *Acta Paediatrica*, *85*(8), 981–985. https://doi.org/10.1111/j.1651-2227.1996.tb14198.x

Beekink, E., Van Poppel, F., & Liefbroer, A. C. (1999). Surviving the loss of the parent in a nineteenth-century Dutch provincial town. *Journal of Social History*, *32*(3), 641–670. https://doi.org/10.1353/jsh/32.3.641

Beekink, E., Van Poppel, F., & Liefbroer, A. C. (2002). Parental death and death of the child: Common causes or direct effects? In R. Derosas & M. Oris (Eds.), *When dad died: Individuals and families coping with distress in past societies* (pp. 234–260). Peter Lang.

Breschi, M., & Mazzoni, S. (2019). Senza padre e madre: Il destino dei figli Alghero 1866-1935. *Famiglia tra mutamenti demografici e sociali*. 37–46.

Campbell, C. D., & Lee, J. Z. (2002). When husbands and parents die: Widowhood and orphanhood in late imperial Liaoning, 1789–1909. In R. Derosas & M. Oris (Eds.), *When Dad died: Individuals and families coping with distress in past societies* (pp. 301–322). Peter Lang.

Clark, S. L., Belfort, M. A., Dildy, G. A., Herbst, M. A., Meyers, J. A., & Hankins, G. D. (2008). Maternal death in the 21st century: Causes, prevention, and relationship to cesarean delivery. *American Journal of Obstetrics and Gynecology*, *199*(1), 36–e1. https://doi.org/10.1016/j.ajog.2008.03.007

Fox, J., Willführ, K., Gagnon, A., Dillon, L., & Voland, E. (2017). The consequences of sibling formation on survival and reproductive success across different ecological contexts: A comparison of the historical Krummhörn and Quebec populations. *The History of the Family*, *22*(2–3), 364–423. https://doi.org/10.1080/1081602X.2016.1193551

Jaadla, H., Potter, E., Keibek, S., & Davenport, R. (2020). Infant and child mortality by socio-economic status in early nineteenth-century England. *The Economic History Review*, *73*(4), 991–1022. https://doi.org/10.1111/ehr.12971

Klesment, M., & Lust, K. (2021). Short-term economic stress and mortality differentials in rural Estonia, 1834–1884. *Scandinavian Economic History Review*, *69*(1), 22–40. https://doi.org/10.1080/03585522.2020.1739121

Laugaste, E. (1986). *Eesti rahvaluule* [Estonian folklore]. (3rd ed.). Valgus.

Laugaste, E. (1989). *Haljala regilaulud* [1. vihik [Haljala Runic Songs]]. Eesti Raamat.

Ligi, H. (1993). Imikute ja laste suremuse geograafia Eestis 18.–19. sajandil [The geographic pattern of infant and child mortality in Estonia in the 18th–19th centuries]. *Kleio. Ajaloo Ajakiri*, *8*, 3–7.

Lust, K. (2021). A not so undesirable status? Widowhood options and widows' living conditions in post-emancipation rural Estonia. *The History of the Family*, *26*(1), 74–99. https://doi.org/10.1080/1081602X.2020.1796749

Mirov, R., & Tuvi, E. (2009). *Lüganuse regilaulud* [Lüganuse Runic Songs]. Eesti Kirjandusmuuseum.

Oris, M., Derosas, R., & Breschi, M. (2004). Infant and child mortality. In T. Bengtsson, C. Campbell, & J. Z. Lee (Eds.), *Life under pressure: Mortality and living standards in Europe and Asia, 1700–1900* (pp. 359–398). MIT Press.

Pavard, S., Gagnon, A., Desjardins, B., & Heyer, E. (2005). Mother's death and child survival: The case of early Quebec. *Journal of Biosocial Science*, *37*(2), 209–227. https://doi.org/10.1017/s0021932004006571

Reher, D. S., & González-Quiñones, F. (2003). Do parents really matter? Child health and development in Spain during the demographic transition. *Population Studies*, *57*(1), 63–75. https://doi.org/10.1080/0032472032000061730

Sear, R., & Mace, R. (2008). Who keeps children alive? A review of the effects of kin on child survival. *Evolution and Human Behavior*, *29*(1), 1–18. https://doi.org/10.1016/j.evolhumbehav.2007.10.001

Tampere, H., Tampere, E., & Kõiva, O. (2003). *Eesti rahvamuusika antoloogia. Helisalvestusi Eesti Rahvaluule Arhiivist 3* [The Anthology of Estonian folk music. Recordings from the Estonian Folklore Archives]. Eesti Kirjandusmuuseum.

Tedre, Ü. (1970). *Eesti rahvalaulud* [Estonian folk songs]. (Vol. II). Eesti Raamat.

Tymicki, K. (2009). Correlates of infant and childhood mortality: A theoretical overview and new evidence from the analysis of longitudinal data of the Bejsce (Poland) parish register reconstitution study of the 18th–20th centuries. *Demographic Research*, *20*, 559–594. https://doi.org/10.4054/DemRes.2009.20.23

Vahtre, S. (1985). Eine neue Gesellschaft – Neue Erscheinungen in der Demographie [New society – New phenomena in demography]. In A. Loit (Ed.), *National movements in the Baltic countries during the 19th century* (pp. 227–243). Acta Universitatis Stockholmiensis.

Van Poppel, F. (2000). Children in one-parent families: Survival as an indicator of the role of the parents. *Journal of Family History*, *25*(3), 269–290. https://doi.org/10.1177/036319900002500301

Willführ, K. P. (2009). Short- and long-term consequences of early parental loss in the historical population of the Krummhörn (18th and 19th century). *The American Journal of Human Biology*, *21*(4), 488–500. https://doi.org/10.1002/ajhb.20909

Willführ, K. P., & Gagnon, A. (2013). Are stepparents always evil? Parental death, remarriage, and child survival in demographically saturated Krummhörn (1720–1859) and expanding Québec (1670–1750). *Biodemography and Social Biology*, *59*(2), 191–211. https://doi.org/10.1080/19485565.2013.833803