

Why do late parents live longer?

Previous research indicates that in contemporary populations women who have a child after age 40 experience lower mortality later in life (Doblhammer 2000, Perls 1997). Whether this is due to biological or social factors is still unknown. One possibility to test this is to explore old age mortality of late fathers. If late fathers similar to late mothers experience a mortality advantage later in life then social factors are the most probable explanation.

We analyse post-reproductive mortality of late parents on the basis of the Danish population register. The data consist of a 28-year mortality follow-up of the 1970 census. All men and women born between 8 November 1913 and 8 November 1920 are included. At the time of the census (9 November 1970) they had reached ages 50 to 56. At the end of the mortality follow-up (31 December 1998) they had reached a maximum age of 85 years. A 50% random sample is drawn from the register data.

The 1970 census does not contain information about the fertility history, only about the household formation. This information is used to identify men and women who have at least one child that was born after their 40s birthday. A late mother or father is defined as someone whose age difference to one of the children living in the household is not more than 40 years. This definition underlies the assumption that usually children remain at the home of their parents until they completed age 16.

We estimate the force of mortality at ages 50 to 85 of all Danes who were married in 1970 on the basis of a Cox proportional hazard model. For both males and females 8 models are estimated. The first model (Model 1) explores the net effect of a late parenthood on late life mortality. The second model (Model 2) corrects for the number of children in the household at the 1970 census and corrects primarily for the fact that childless individuals have increased late life mortality (Doblhammer 2000). The next set of models (Models 3 and 4) corrects for the individual's own socio-economic status while the last three models account for partner's age (Models 5 and 6) as well as for partner's socio-economic status (Models 7a and 7b).

Late mothers as well as late fathers experience a mortality advantage later in life independent of their social status (measured in terms of occupational status) and the number of children in the household. However, if characteristics of the spouse, particularly age of the spouse and age difference between the partners is introduced, the mortality advantage is attenuated for males (RR late fathers: 0.98, $p=0.54$) but not for females (RR late mothers: 0.93, $p=0.04$). A difference of 7 per cent in the mortality of late mothers is comparable to the effect found in earlier studies (Doblhammer 2000).

This result suggests that the effect of a late parenthood on late life mortality is gender specific. Late fathers appear to benefit primarily from family circumstances related to late parenthood while at least part of the effect on late mothers appears to be of a biological origin.

Doblhammer G., "Reproductive History and Mortality Later in Life: A Comparative Study of England & Wales and Austria", *Population Studies* 54 (2), 169-176 (1999).

Perls, T. T., L. Alpert, and R. C. Fretts. 1997. "Middle aged mothers live longer", *Nature* **389**: 133.

Table 1a: Married Females: Effect of late parenthood on the force of mortality at ages 50+ corrected for the number of children in the household and socio-economic status.

	Model 1		Model 2		Model 3		Model 4	
	Risk Rat.	P-Value	Risk Rat.	P-Value	Risk Rat.	P-Value	Risk Rat.	P-Value
Late Parent								
No	RG		RG		RG		RG	
Yes	0,867	0,0001	0,946	0,1169	0,944	0,1044	0,941	0,0866
Birth Cohort								
1919-1920	RG		RG		RG		RG	
1917-1918	1,032	0,1998	1,016	0,5067	1,016	0,521	1,011	0,6694
1915-1916	1,007	0,778	0,982	0,4542	0,978	0,375	0,973	0,2691
1913-1914	1,058	0,0503	1,023	0,439	1,017	0,5618	1,007	0,8245
Number of children in household								
0			1,19	0,0001	1,175	0,0001	1,17	0,0001
1			1,073	0,0133	1,069	0,0198	1,068	0,0213
2-4			RG		RG		RG	
5+			1,223	0,1956	1,186	0,2718	1,168	0,3163
Quality of Housing								
good					RG		RG	
average					1,061	0,1773	1,056	0,2133
poor					1,282	0,0001	1,261	0,0001
Occupation								
Family Workers							0,899	0,059
Skilled workers & apprentices							0,993	0,9746
Unskilled Workers							1,122	0,0285
Salaried Employees & Public Servants							0,995	0,9215
Self-employed							RG	
missing							1,143	0,0071

Table 1b: Married Females: Effect of late parenthood on the force of mortality at ages 50+ corrected for the number of children in the household, socio-economic status, partner's age and partner's socio-economic status.

	Model 5		Model 6		Model 7a		Model 7b	
	Risk Rat.	P-Value	Risk Rat.	P-Value	Risk Rat.	P-Value	Risk Rat.	P-Value
Late Parent								
No	RG		RG		RG		RG	
Yes	0,938	0,0698	0,939	0,078	0,929	0,0386	0,931	0,0436
Birth Cohort								
1919-1920	RG		RG		RG		RG	
1917-1918	1,014	0,5681	1,01	0,6801	1,016	0,5174	1,009	0,7207
1915-1916	0,977	0,3781	0,973	0,279	0,98	0,4455	0,97	0,2166
1913-1914	1,009	0,784	1,008	0,7957	1,007	0,8257	0,996	0,8853
Number of children in household								
0	1,169	0,0001	1,17	0,0001	1,153	0,0001	1,154	0,0001
1	1,068	0,0209	1,07	0,0178	1,063	0,0327	1,065	0,0281
2-4	RG		RG		RG		RG	
5	1,173	0,3048	1,169	0,3144	1,165	0,326	1,163	0,3321
Housing quality								
good	RG		RG		RG		RG	
average	1,055	0,2184	1,052	0,2484	1,033	0,4581	1,031	0,4874
poor	1,257	0,0001	1,255	0,0001	1,204	0,0001	1,204	0,0001
Occupation								
Family Workers	0,904	0,0734	0,909	0,0909	0,977	0,681	0,979	0,7119
Skilled workers & apprentices	0,999	0,9972	1,006	0,9779	0,94	0,7689	0,944	0,7832
Unskilled Workers	1,126	0,0241	1,131	0,0198	1,024	0,6607	1,026	0,631
Salaried Employees & Public Servants	0,997	0,0241	0,998	0,9759	0,963	0,5015	0,963	0,5037
Self-employed	RG		RG		RG		RG	
missing	1,147	0,0057	1,152	0,0044	1,103	0,0488	1,106	0,0425
Partner's Age								
20-39	1,106	0,6219			1,091	0,6688		
40-44	RG				RG			
45-49	0,791	0,0178			0,796	0,0211		
50-54	0,787	0,0098			0,796	0,014		
55-59	0,765	0,004			0,767	0,0043		
60+	0,804	0,0195			0,787	0,0107		
Age Difference								
7+ years younger			1,25	0,0001			1,161	0,0082
5-6 years younger			1,04	0,2586			1,011	0,7563
3-4 years younger			1,017	0,435			1,004	0,8534
+2 years			RG				RG	
3-4 years older			1,022	0,4305			1,025	0,3596
5+ years older			1,146	0,003			1,134	0,0061
missing			NA				NA	
Partner's Occupation								
Family Workers & missing					0,753	0,0001	0,77	0,0001
Skilled workers & apprentices					0,872	0,0003	0,893	0,004
Unskilled Workers					0,962	0,2298	0,984	0,6323
Salaried Employees &					RG		RG	

Public Servants					0,826	0,0001	0,846	0,0001
Self-employed								

Table 2a: Married Males: Effect of late parenthood on the force of mortality at ages 50+ corrected for the number of children in the household and socio-economic status.

	Model 1		Model 2		Model 3		Model 4	
	Risk Rat.	P-Value	Risk Rat.	P-Value	Risk Rat.	P-Value	Risk Rat.	P-Value
Late Parent								
No	RG		RG		RG		RG	
Yes	0,896	0,0001	0,972	0,1756	0,965	0,0916	0,962	0,0666
Birth Cohort								
1919-1920	RG		RG		RG		RG	
1917-1918	1,038	0,0585	1,024	0,225	1,023	0,2478	1,014	0,4939
1915-1916	1,024	0,2334	0,997	0,8614	0,994	0,7499	0,985	0,437
1913-1914	1,067	0,0051	1,029	0,235	1,025	0,2958	1,007	0,7778
Number of children in household								
0			1,179	0,0001	1,164	0,0001	1,139	0,0001
1			1,053	0,009	1,049	0,0161	1,04	0,0496
2-4			RG		RG		RG	
5			1,059	0,4274	1,049	0,5095	1,036	0,623
Quality of Housing								
good					RG		RG	
average					1,049	0,1702	1,018	0,6085
poor					1,197	0,0001	1,127	0,0001
Occupation								
Family Workers							1,115	0,5584
Skilled workers & apprentices							1,156	0,0001
Unskilled Workers							1,216	0,0001
Salaried Employees & Public Servants							1,114	0,0001
Self-employed							RG	
missing							2,252	0,0001

Table 2b: Married Males: Effect of late parenthood on the force of mortality at ages 50+ corrected for the number of children in the household, socio-economic status, partner's age and partner's socio-economic status.

	Model 5		Model 6		Model 7a		Model 7b	
	Risk Rat.	P-Value	Risk Rat.	P-Value	Risk Rat.	P-Value	Risk Rat.	P-Value
Late Parent								
No	RG		RG		RG		RG	
Yes	0,976	0,2701	0,979	0,3272	0,982	0,391	0,984	0,4594
Birth Cohort								
1919-1920	RG		RG		RG		RG	
1917-1918	1,004	0,8536	1,016	0,4223	1,003	0,8785	1,016	0,4065
1915-1916	0,962	0,0657	0,987	0,5246	0,962	0,0613	0,989	0,5876
1913-1914	0,975	0,3053	1,011	0,6534	0,974	0,2895	1,014	0,5715
Number of children in household								
0	1,125	0,0001	1,125	0,0001	1,122	0,0001	1,121	0,0001
1	1,034	0,0991	1,032	0,112	1,032	0,122	1,03	0,138
2-4	RG		RG		RG		RG	
5	1,038	0,6069	1,036	0,6296	1,046	0,5352	1,043	0,5591
Quality of Housing								
good	RG		RG		RG		RG	
average	1,02	0,574	1,021	0,5614	1,021	0,5501	1,022	0,5375
poor	1,127	0,0001	1,127	0,0001	1,126	0,0001	1,126	0,0001
Occupation								
Family Workers	1,118	0,5477	1,121	0,5399	1,117	0,5609	1,118	0,5555
Skilled workers & apprentices	1,157	0,0001	1,156	0,0001	1,121	0,0001	1,12	0,0001
Unskilled Workers	1,219	0,0001	1,219	0,0001	1,173	0,0001	1,173	0,0001
Salaried Employees & Public Servants	1,114	0,0001	1,114	0,0001	1,09	0,0002	1,089	0,0002
Self-employed	RG		RG		RG		RG	
missing	2,249	0,0001	2,25	0,0001	2,197	0,0001	2,198	0,0001
Partner's Age								
20-39	1,002	0,9726			1	0,9977		
40-44	RG				RG			
45-49	1,006	0,8077			1,007	0,781		
50-54	1,052	0,0606			1,056	0,0431		
55-59	1,112	0,0012			1,122	0,0004		
60+	1,032	0,5524			1,05	0,3676		
Age Difference								
7+ years younger			1,067	0,1117			1,083	0,0534
5-6 years younger			1,059	0,008			1,065	0,0034
3-4 years younger			1,036	0,0471			1,039	0,0331
+2 years			RG				RG	
3-4 years older			0,949	0,0948			0,946	0,0747
5+ years older			1,012	0,7989			1,014	0,7638
missing			NA				NA	
Part. Occ.								
Family Workers					0,972	0,5101	0,971	0,5017
Skilled & Unskilled Workers					1,116	0,0085	1,116	0,0088
Salaried Employees & Public Servants					1,015	0,7358	1,013	0,7563
Self-employed					RG		RG	

missing					0,999	0,9733	0,998	0,9604
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