

INCIDENCE OF TWIN BIRTHS IN DENMARK FROM 1911 TO 1974

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A survey of twin births in Denmark in relation to the total number of births from 1911 to 1974 shows a significant decrease in the dizygotic twin birth rate for all maternal age groups. The possible environmental causes of such a decrease are discussed.

INTRODUCTION

A number of papers have been written about racial differences in dizygotic (DZ) and similarities in monozygotic (MZ) twin rates. Incidence of DZ twin births varies from approximately 2 per 1,000 in Japan to 10 per 1,000 in Denmark and up to 40 per 1,000 for African Yorubas (Bulmer 1969, Scheinfeld and Schachter 1970). Monozygotic rates only vary from 3.2 per 1,000 in Spain to 4.0 per 1,000 in Japan and 5.0 in African Yorubas. Recent studies have further revealed that there has been a decrease in the incidence of DZ, but not of MZ twin births during this century in Sweden (Akesson et al. 1969), Finland (Eriksson 1974), and other countries, such as Norway, Holland, Belgium, Spain, Portugal, Scotland and Switzerland, as well as Australia and USA (James 1972).

RESULTS

Fig. 1 and Tables 1-4 show the distribution by birth rates of liveborn twins in Denmark in relation to all livebirths in the three maternal age groups: <24, 25-34, and 35 and above. The DZ twin rates fell from 1.58% during 1911-1915 for the maternal age group 35+ to 0.85% in 1971-1974 (Tables 1 and 2). The figures for the maternal age group 25-34 was 1.28% during the period 1911-1915 and 0.71% during 1971-1974 (Tables 1 and 3). For the

Table 1. *Decrease in dizygotic twin births from 1911 to 1974*

Maternal age group	Percentage of DZ twin births		Total decrease of percentage	Decrease* relative to percentage 1911-1974
	1911-1915	1971-1974		
≥ 35	1.68	0.85	0.83	0.51
25-34	1.28	0.71	0.57	0.45
≤ 24	0.61	0.32	0.29	0.48

* Example: $\frac{1.68 - 0.85}{1.68} = 0.51$

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age group <24 it was 0.61% in 1911-1915 and 0.32% during 1971-1974 (Tables 1 and 4). A statistical analysis with χ^2 tests and regression analysis reveals a significant decrease in DZ twin birth rates for all three age groups; the amount of the decrease is increasing. The incidence of MZ twin births for the different maternal age groups did not show any significant fall during this century. The rates for MZ twins are shown in Tables 2-4 and Fig. 1.

Table 5 shows the birth distribution of triplets in Denmark during this century. The rates varied very little between 0.09 per 1,000 during 1966-1970 and 0.19 per 1,000 during 1921-1925 and showed no decrease over time.

Table 2. *Twin pairs born to mothers aged ≥ 35 (Denmark: 1911-1974)*

Year of birth	Total number of births	Twin births ^a						
		MM	FF	MF	DZ twin pairs		MZ twin pairs	
					N	%	N	%
1911-1915	80,267	510	478	673	1346	1.68	315	0.39
1916-1920	78,130	512	494	593	1186	1.52	413	0.53
1921-1925	79,507	452	491	661	1322	1.66	282	0.35
1926-1930	64,153	433	367	510	1020	1.59	290	0.45
1931-1935	56,717	370	324	460	920	1.62	234	0.41
1936-1940	53,369	329	313	403	806	1.51	239	0.45
1941-1945	66,464	385	405	566	1132	1.70	224	0.34
1946-1950	70,717	476	405	505	1010	1.43	376	0.53
1951-1955	50,820	282	281	342	684	1.35	221	0.43
1956-1960	43,002	248	220	277	545	1.29	191	0.44
1961-1965	37,233	192	178	254	508	1.36	116	0.31
1966-1970	25,926	139	112	146	292	1.13	105	0.40
1971-1974	15,529	72	82	66	132	0.85	88	0.57

^a Estimated zygosity by Weinberg's differential method, according to which the number of all DZ twins is twice that of different sexed twins.

Table 3. *Twin pairs born to mothers aged 25 to 34 (Denmark: 1911-1974)*

Year of birth	Total number of births	Twin births ^a						
		MM	FF	MF	DZ twin pairs		MZ twin pairs	
					N	%	N	%
1911-1915	188,599	965	869	1211	2422	1.28	623	0.33
1916-1920	185,451	887	955	1166	2332	1.26	676	0.36
1921-1925	187,684	853	926	1202	2404	1.28	577	0.31
1926-1930	173,214	960	923	1211	2422	1.40	672	0.39
1931-1935	165,656	878	834	1053	2106	1.27	659	0.40
1936-1940	180,808	962	891	1087	2174	1.20	766	0.42
1941-1945	217,193	1126	1065	1331	2662	1.23	860	0.40
1946-1950	219,149	1140	916	1296	2592	1.18	760	0.35
1951-1955	190,587	945	813	1117	2234	1.17	641	0.34
1956-1960	175,372	851	713	945	1890	1.07	619	0.35
1961-1965	177,562	790	788	853	1706	0.96	725	0.40
1966-1970	168,089	670	646	674	1348	0.80	642	0.38
1971-1974	155,373	618	576	550	1100	0.71	644	0.41

^a Estimated zygosity according to Weinberg's differential method.

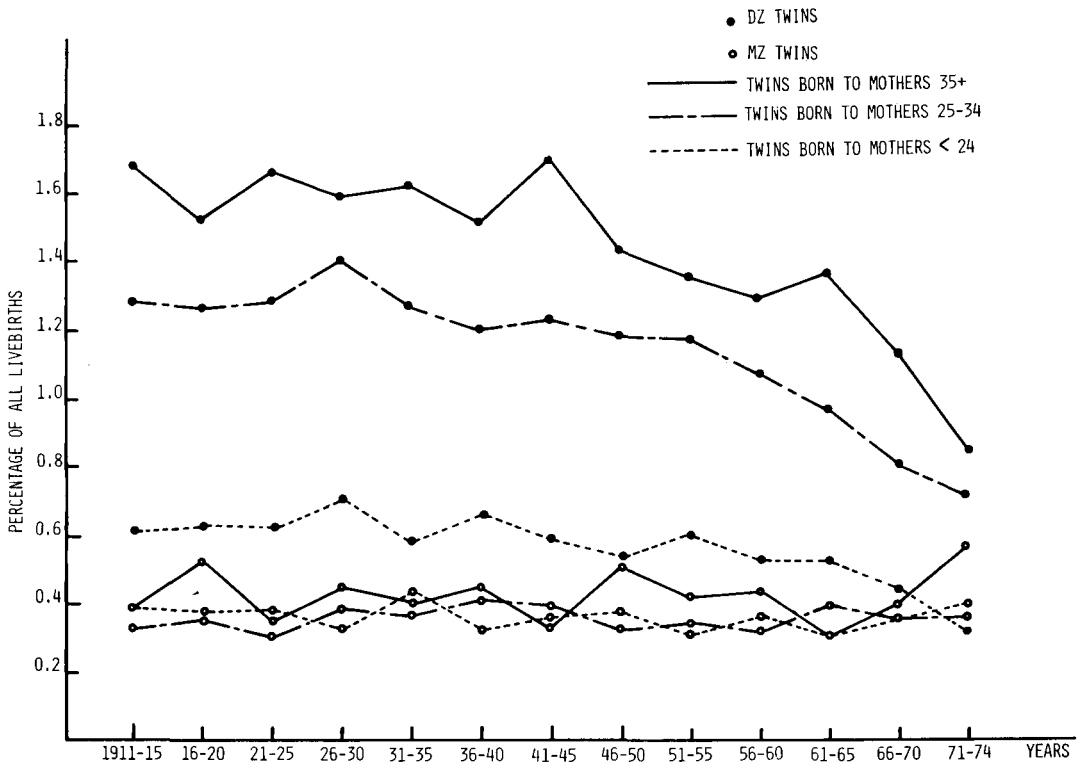


Fig. 1. Distribution by incidence of liveborn twins in Denmark in relation to maternal age during the years 1911 to 1974.

Table 4. Twin pairs born to mothers ≤ 24 years (Denmark: 1911-1974)

Year of birth	Total number of births	Twin births ^a						
		MM	FF	MF	DZ twin pairs		MZ twin pairs	
					N	%	N	%
1911-1915	98,623	344	334	299	598	0.61	379	0.38
1916-1920	101,169	350	342	319	638	0.63	373	0.37
1921-1925	109,265	385	355	336	672	0.62	404	0.37
1926-1930	103,997	355	361	371	742	0.71	345	0.33
1931-1935	102,616	378	363	301	602	0.59	440	0.43
1936-1940	109,882	362	370	367	734	0.67	365	0.33
1941-1945	139,761	494	433	417	834	0.60	510	0.36
1946-1950	143,938	462	479	389	778	0.54	552	0.38
1951-1955	145,543	455	454	445	890	0.61	464	0.32
1956-1960	159,286	521	480	424	848	0.53	577	0.36
1961-1965	190,875	532	569	506	1012	0.53	595	0.31
1966-1970	191,709	599	567	436	872	0.45	730	0.38
1971-1974	122,713	358	330	198	396	0.32	490	0.40

^a Estimated zygosity according to Weinberg's differential method.

Table 5. *Triplet births in Denmark from 1911 to 1974*

Year of birth	Total number of births	Same-sex triplet births		Different sex triplet births		Total triplet births	
		N	Per 1,000 births	N	Per 1,000 births	N	Per 1,000 births
1901-1905	368,945	21	0.057	34	0.092	55	0.15
1906-1910	379,749	24	0.063	26	0.068	50	0.13
1911-1915	367,489	25	0.068	31	0.084	56	0.15
1916-1920	364,750	28	0.077	35	0.096	63	0.17
1921-1925	376,456	39	0.104	32	0.085	71	0.19
1926-1930	341,364	25	0.073	26	0.076	51	0.15
1931-1935	324,989	22	0.068	31	0.095	53	0.16
1936-1940	344,059	30	0.087	27	0.078	57	0.17
1941-1945	423,418	39	0.092	36	0.085	75	0.17
1946-1950	433,804	46	0.106	33	0.076	79	0.18
1951-1955	386,950	17	0.044	22	0.057	39	0.10
1956-1960	377,660	25	0.066	21	0.057	46	0.12
1961-1965	405,670	31	0.076	17	0.042	48	0.12
1966-1970	385,724	19	0.049	15	0.039	34	0.09
1971-1974	293,315	20	0.068	18	0.061	38	0.13

DISCUSSION AND CONCLUSION

The relative amount of decrease were the same for all three maternal age groups which show that the fall in incidence of DZ twins during this century must be due to other factors than maternal age. The number of previous pregnancies is known to affect the incidence of DZ twin births (Scheinfeld and Schachter 1970) and the decrease in the size of sibships during this century in European as well as in other industrialized countries may be a contributing factor to the fall in incidence of twin births. The introduction of gestagens as contraceptive medication during the late sixties does not seem to be of any importance, as the decline of incidence of DZ twins took place earlier as shown in Fig. 1. A reduction in the female and male general fertility would reduce the incidence of DZ twin births and evidence of marked decrease of concentration of spermatocytes have been found (Nelson and Bunge 1974). Possible contributing factors may be the increase in the consumption of drugs, particularly psychotropic drugs, the use of pesticides and food additives and the increased pollution in general. Further studies are needed to allow significant conclusions concerning these factors, especially comparisons between countries and areas with marked differences in the mentioned environmental factors.

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