THE SECULAR DECLINE IN DIZYGOTIC TWINNING RATES IN ITALY

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It is shown that the recent secular decline in DZ twinning rates in Italy was not solely due to secular changes in birth order or maternal age.
The extent of the decline differed in different maternal age-parity categories. It seemed to be greater in younger women than older ones for constant parity. The data gave no clear support to the suggestion that the decline is associated with social class.
It seems that this secular decline in Italy has not been greatly affected by the use of ovulation-inducing drugs.

INTRODUCTION

I have noted (James 1972) that DZ twinning rates have been declining during recent years in many countries. I cited data suggesting that in England & Wales and in Scotland these declines have been maternal-age-specific. Hence, the overall declines could not have been wholly due to secular changes in mean maternal age. However, DZ twinning rates are associated with both maternal age and parity independently. In general, when one of these variables is held constant, DZ twinning rates rise with the other (Heuser 1967). So, the possibility remains that the secular declines in DZ twinning rates might have been due to secular declines in the mean birth rank of maternities (perhaps in combination with declines in maternal age).

As far as I know, Italy is the only country which routinely classifies its twin maternities simultaneously by birth rank, maternal age, and sex combination. This note reports the results of an analysis of these data for Italy, 1957-69.

METHODS

To avoid difficulties with large standard errors, attention was arbitrarily confined to those maternal-age-and-parity categories which provided more than 100 pairs of opposite-sex twins in each of the years 1957-69. This left eleven categories as shown in the table.

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	Parity 1	Parity 2	Parity 3	Parity 4
Maternal age 20-24	+			
Maternal age 25-29	+	+	+	
Maternal age 30-34	+	+	+	+
Maternal age 35-39		+	+	+

RESULTS

Table 1 and the Figure show the secular changes in opposite-sex twinning rates in each of these categories. Visual inspection would suggest that there is an overall decline here. The matter can be settled by the application of Jonckheere's (1954) test. For these data, Jonckheere's *P*-statistic takes a value of 630, giving a normalised deviate of more than 7, $p < 10^{-11}$. One may conclude with some confidence that the overall drop in the opposite-sex twinning rate (at any rate in Italy) has not been simply due to changes in maternal age and parity.

Without comparable data, one would not be certain that this conclusion applies to the fall in twinning rates in other countries. But bearing in mind that (1) the fall seemed to start at about the same time in the various countries, and (2) the extent of the fall (expressed as a percentage of the rate in 1957) was of the same order for a number of countries, I would suppose that it is unlikely that changes in age and parity were the sole explanation of the decline in most countries.

The Social Class Hypothesis

The data from Italy provide an opportunity to test a hypothesis raised in my earlier paper, namely, that the decline in DZ twinning rates has been greater in the middle than in the lower social classes.

In England & Wales and in Scotland, the average social class ratings of women in the various maternal-age-and-parity categories are not the same. In particular, young multigravidae are, on the average, from a lower social-class background than are elderly primigravidae (those aged 30 and more) (Butler and Bonham 1963, p. 27). It seems reasonable to assume that this feature is characteristic of Italy too. Then, if the hypothesis above were true, one would expect the extent of the decline in DZ twinning rates to be greater in elderly primigravidae than in young multigravidae.

As a measure of the extent of the fall in each age-and-parity-specific category, let us take E, where

$$E = \frac{\left(\sum_{i=1957}^{i=1962} R_i - \sum_{i=1964}^{i=1969} R_i\right)}{\sum_{i=1957}^{i=1962} R_i} \times 100$$

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TABLE 1

OPPOSITE-SEX TWINNING BY PARITY AND MATERNAL AGE
(Rates per 1000 legitimate maternities, Italy 1957-69)

A. First Eleven Categories[a]

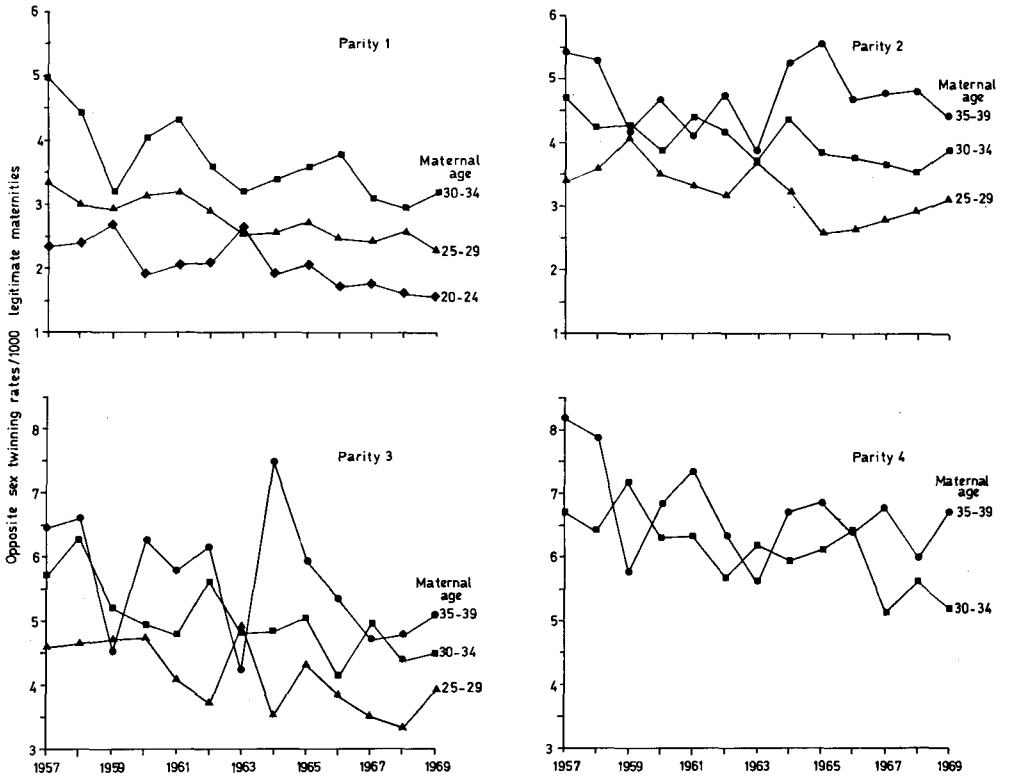
Parity	1	1	1	2	2	2	3	3	3	4	4
Mat. age	20-24	25-29	30-34	25-29	30-34	35-39	25-29	30-34	35-39	30-34	35-39
1957	2.359	3.283	4.950	3.365	4.732	5.433	4.608	5.733	6.453	6.718	8.162
1958	2.403	2.982	4.412	3.559	4.215	5.339	4.659	6.317	6.603	6.389	7.864
1959	2.718	2.949	3.174	4.062	4.280	4.182	4.711	5.212	4.532	7.171	5.736
1960	1.947	3.112	4.038	3.490	3.879	4.689	4.740	4.941	6.280	6.286	6.830
1961	2.077	3.176	4.353	3.327	4.431	4.010	4.055	4.773	5.795	6.339	7.366
1962	2.089	2.893	3.602	3.184	4.209	4.782	3.692	5.615	6.187	5.694	6.378
1963	2.663	2.543	3.204	3.670	3.689	3.872	4.965	4.803	4.216	6.194	5.573
1964	1.939	2.538	3.428	3.259	4.367	5.268	3.518	4.830	7.493	5.934	6.701
1965	2.067	2.731	3.625	2.576	3.830	5.531	4.337	5.075	5.938	6.108	6.861
1966	1.738	2.464	3.809	2.648	3.794	4.695	3.839	4.601	5.377	6.419	6.400
1967	1.787	2.449	3.108	2.776	3.675	4.785	3.508	4.973	4.723	5.119	6.835
1968	1.665	2.596	2.950	2.914	3.545	4.816	3.337	4.382	4.793	5.616	5.960
1969	1.625	2.277	3.203	3.125	3.867	4.408	3.933	4.508	5.091	5.193	6.702

B. Further Six Categories[b]

Parity	1	2	4	5	5	6
Maternal age	35-39	20-24	25-29	30-34	35-39	35-39
1957	4.902	2.296	5.807	6.488	8.381	7.979
1958	4.800	2.811	4.817	6.679	7.480	9.511
1959	4.166	2.998	5.729	7.953	6.999	7.798
1960	4.502	2.432	5.571	7.614	8.813	9.635
1961	4.854	2.055	4.210	6.474	8.583	9.660
1962	4.368	2.335	4.533	6.601	7.838	8.021
1963	3.696	2.907	6.136	8.581	8.004	8.346
1964	4.611	1.728	3.984	7.026	8.508	7.872
1965	4.781	2.067	4.620	7.779	7.475	9.070
1966	5.399	1.966	5.052	5.613	8.525	6.610
1967	4.133	2.3318	3.867	7.411	7.190	8.412
1968	4.673	1.787	3.655	6.383	6.360	7.057
1969	4.175	2.3319	4.135	5.764	7.334	7.819

[a] For this table, the *P*-statistic of Jonckheere (1954) takes a value of 630, $z > 7$, $p < 10^{-11}$.
The only purpose of the 2nd and 3rd decimal figures is to avoid tied ranks.
Each of the eleven age-and-parity categories above yielded at least 100 opposite-sex twin pairs in each year.

[b] Each of these six age-and-parity categories yielded at least 50 opposite-sex twin pairs in each year.



Figure

and R_i is the age-and-parity-specific opposite-sex twinning rate in year i.

Table 2 gives the values of E for all those age-and-parity categories which yielded 50 or more sets of opposite-sex twins per year 1957-69. It is not clear from this table that social class is associated with the decline at all. The two higher social class categories (primiparae

TABLE 2

VALUES OF E, THE MEASURE OF THE EXTENT OF THE DECLINE IN THE OPPOSITE-SEX TWINNING RATE, BY AGE AND PARITY

(Italy 1957-69)

Maternal Age	Parity					
	1	2	3	4	5	6
20-24	20.4	18.2				
25-29	18.2	17.6	15.1			
30-34	18.0	10.4	13.0	10.9	4.4	
35-39	–0.1	–3.8	6.8	6.8	5.6	11.0

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TABLE 3

SUMMARY OF REPORTS ON DECLINE IN DZ TWINNING BY MATERNAL AGE, PARITY AND SOCIAL CLASS

Area	England & Wales	Aberdeen	Italy
Social class	No data	Greater decline in upper classes	No clear indication
Parity	No data	Decline greatest in old primiparae; then successively less in young multiparae, old multiparae and young primiparae	No clear indications though some suggestion that the decline is greater at lower parity, age held constant
Maternal age	Greater decline in older women		Greater decline in younger women when parity held constant
Reference	James 1972	MacGillivray 1970	Present note

aged 30-34 and 35-39) have very different values of E: one value is higher and the other lower than those for the various categories of young multigravidae. Neither does there seem to be any clear association between parity and the extent of the decline. However, in these data there seems to be a decided association with maternal age. The proportionate decline is less in older women.

COMMENT

The present results seem at variance with those already reported from England & Wales (James 1972) and Aberdeen (MacGillivray 1970). Table 3 summarises these differences. It would be premature to attempt reconciling these findings before data are available on the use of ovulation-provoking drugs. I am indebted to Dr. Paolo Parisi (Acting Editor of this Journal) for the observation (Private Communication 13th November 1973) that these drugs "have been relatively recently introduced in Italy and it may be safely assumed that their use is still far from generalised". However I have seen no estimates of the extent of the use of these drugs in Great Britain. In particular, information is required on the maternal age, parity and social class of each member of a sample of users. It would also be useful to know the obstetric result in each case. Lastly, we want estimates of the extent of such drug use in different countries.

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RIASSUNTO

Il Secolare Declino delle Nascite di Gemelli Dizigotici in Italia

Viene dimostrato che il declino delle nascite di gemelli DZ nell'ultimo secolo non è stato unicamente causato da cambiamenti relativi all'ordine di genitura o all'età materna.
L'entità del declino risulta diversa nelle diverse categorie di età materna e parità. Essa sembra essere maggiore nelle donne piú giovani che in quelle piú anziane a parità costante.
Non sembrano esservi elementi in favore dell'ipotesi che il declino sia associato alla classe sociale.
Sembra che in Italia tale declino non sia stato grandemente influenzato dall'uso degli ovulatori.

RÉSUMÉ

Le Déclin Séculaire des Naissances de Jumeaux Dizygotiques en Italie

On démontre que le déclin des naissances de jumeaux DZ au cours du dernier siècle n'a pas été uniquement causé par des changements relatifs au rang de naissance ou à l'âge maternel.
L'entité du déclin s'avère différente dans les diverses catégories d'âge maternel et de parité. Elle semble être plus importante chez les jeunes femmes que chez les plus âgées à parité constante. Il ne semble pas y avoir d'éléments en faveur de l'hypothèse selon laquelle le déclin serait associé à la classe sociale.
Il semble qu'en Italie un tel déclin n'ait pas pour cause majeure l'usage des ovulatoires.

ZUSAMMENFASSUNG

Der Rückgang der ZZ-Geburten in Italien im letzten Jahrhundert

Es wird bewiesen, dass der Rückgang der ZZ-Geburten in den letzten hundert Jahren nicht nur durch die veränderten Verhältnisse in Bezug auf Kinderzahl und Alter der Mütter bedingt sind.
Die Verminderung ändert sich bei den verschiedenen Kategorien entsprechend dem Alter der Mutter und der Geburtenzahl. Bei gleicher Geburtenzahl scheinen ZZ-Geburten bei jüngeren Müttern seltener zu sein als bei älteren. Hingegen besteht kein Beweis dafür, dass der Rückgang mit der sozialen Klasse in Zusammenhang steht.
Es scheint, dass der Gebrauch von Ovulationspräparaten in Italien keinen grossen Einfluss auf den Rückgang der ZZ-Geburten gehabt hat.

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