



Acta Genet Med Gemellol 43: 139-144 (1994)
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International Congress
40th Anniversary of The Mendel Institute

Incidence and Neonatal Mortality of Twins: Italy 1981-90

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Abstract. The aims of this study were: 1) to study the characteristics of birth and neonatal mortality (NM) rates of twins as compared to singletons in recent years in Italy; 2) to evaluate NM rate differences among twins and singletons by birthweight; 3) to calculate the cause-specific NM rates among singletons and twins. Data concerning all live-born infants were obtained from the birth and death records of the Italian Institute of Statistics (ISTAT) for the years 1981, 1985, 1989 and 1990 and were analyzed by the Statistics Office of the Italian National Institute of Health. Between 1981 and 1990 the incidence of twins increased from 18.3 to 19.1 per thousand livebirths. This increase was mainly related to twins resulting from multiple pregnancies, thus, the proportion of twins weighing <1500g also increased from 67 to 77 per thousand. Twins accounted for 10% of overall neonatal mortality in 1981 and 14% in 1990. Between 1981 and 1990 in the Centre-South of Italy the crude NM rates showed a greater decrease among singletons than among twins, while in the North the decrement involved both singletons and twins. The birthweight-specific NM rate showed a steady improvement in survival for twins rather than for singletons in the 1500-2499g weight range. Taking each cause of death in 1989-90, NM rates were considerably higher for twins compared to singletons, Twin mortality risks due to newborn respiratory distress syndrome (RDS) and asphyxia were respectively 11 and 8 times that of singletons. The comparison between twin NM rates in the three geographical areas and in relation to the cause of death indicated a greater incidence of RDS and asphyxia in the Centre-South than in the North.

This study offers indications on the planning of perinatal care in order to improve twin survival in the Centre and South of Italy, particularly with regard to the prevention and care of asphyxia-RDS.

Key words: Twin incidence, Twin neonatal mortality rates, Neonatal mortality causes

INTRODUCTION

Recent efforts to decrease neonatal mortality (NM) have focused on a more attentive supervision of high-risk groups. Recent studies [2] have reported twin infant mortality rates to be five times that of singletons. Moreover, the diffusion of artificial fertilization is claimed to have brought about an increase in the number of twin births. As the problem seems to be progressing, the recent data available from the Italian Institute of Statistics (ISTAT) stimulated us to up-date knowledge on the epidemiologic characteristics of twins in Italy.

The aims of the study were: 1) to study the characteristics of birth and NM rates of twins compared to singletons in recent years; 2) to evaluate NM rate differences among twins and singletons based on birthweight and geographic area; 3) to calculate the cause-specific NM rates for singletons and twins.

MATERIAL AND METHODS

Data concerning all liveborn infants were obtained from the ISTAT birth and death files for 1981, 1985, 1989 and 1990 and processed by the Statistics Office of the National Institute of Health. Missing data on birth weight in the death files ranged from 3.9 to 6.7 percent. Twin and singleton NM rates were calculated by birthweights (VLBW: 500-1499g; MLBW:1500-2499g; and NBW: = >2500g), by areas of birth (Northern, Central and Southern Italy) and by causes of death. ISTAT codifies the single causes reported in death certificates, using the "Perinatal (P) Classification", in which, the codes of the "IX International Classification of Diseases" (ICD) are summarized into 56 causes. We further grouped the ISTAT P causes into the following major causes of death: **Congenital Anomalies** (ICD: 740-759); **Asphyxia** (ICD: 760, 761.1, 761.2-9, 762.0-6, 763.0-2, 763.5-9, 766, 767, 768); **Immaturity** (ICD: 764-765); **Respiratory Distress Syndrome** (ICD: 769, 770); **Specific Neonatal Causes** (ICD: 761.1, 762.7-9, 771, 773, 775, 776, 001-139, 240-279, 320-389, 460-519, 520-579); **Other Causes** (ICD: 772, 774, 775.1-9, 776.1-9, 778, 779, 140-239, 280-319, 390-459, 580-739, 780-799, 800-999).

RESULTS

Natality

In Italy births were approx. 623,000 in 1981 and 569,000 in 1990 (-8.7%). The geographic distribution of births did not change during those years and in 1990 it was approximately: 36% in the North, 17% in the Centre and 47% in the South. Twins born alive were 1.83% (C.I. 95%: 1.80-1.87) in 1981 and 1.91% (C.I. 95%: 1.87-1.94) in 1990. The number of twins resulting from triplet or higher multiple pregnancies increased by a factor of 3 in the period 1981 through 1990. The birthweight distribution of singleton livebirths did not change, while among twins there was a significant increase in the VLBW twin percentage, ranging from 6.7% (C.I. 95%: 6.2-7.1) to 7.7% (C.I. 95%:7.2-8.2).

Neonatal mortality

Twins accounted for 10% of overall neonatal deaths in 1981 and 14% in 1990. In 1990 the distribution of neonatal deaths by birthweight was as follows: Singletons ELBW = 24%, VLBW = 38%, MLBW = 23%; Twins ELBW = 44%, VLBW = 68%, and MLBW = 22%. NM rates for 1981, 1985 and 1990 are shown by geographical area and plurality in Tab. 1. In Italy the decrease in NM was greater for singletons than twins, leading to an increase in the twin-to-singleton mortality ratio (from 5.9 to 8.3). Nevertheless, in the North the improvement in survival involved both singletons and twins. Despite the general decrease, in 1990 NM rates were still higher in the Centre and South of Italy than in the North, with a relative twin/singleton risk range of 8.6 in the South and 9.9 in the Centre.

Table 1 - Neonatal mortality rates per 1,000 livebirths by geographical area and plurality, Italy 1981, 1985 and 1990

	North	Centre	South	Italy
<i>1981</i>				
Singletons	8.77	11.12	10.79	10.11
Twins	61.55	54.99	61.53	60.42
Twin/singleton relative risk	7.02	4.95	5.70	5.98
<i>1985</i>				
Singleton	5.96	7.18	8.78	7.5
Twins	35.08	43.35	57.27	47.53
Twin/singleton relative risk	5.89	6.04	6.52	6.34
<i>1990</i>				
Singleton	4.47	6.26	6.20	5.58
Twins	28.11	62.28	53.63	46.33
Twin/singleton relative risk	6.29	9.95	8.65	8.30
<i>% Change of rates (from 1981 to 1990)</i>				
Singletons	-49.03	-43.71	-42.54	-44.81
Twins	-54.33	13.26	-12.84	-23.32

Comparison of birthweight-specific NM rates among twins and singletons for 1981, 1985 and 1990 are shown in Fig. 1. We found no differences in NM rates between VLBW singletons and twins. However, a reduced risk of death emerged for MLBW twins, and a two-fold increased risk for twins weighing >2500g, compared to singletons.

Forty-one per cent of singletons and 47% of twins died during the first 24 hours of life (1989 and 1990 data), while 21% of singletons and 13% of twins died between the first 7 and 29 days of life. These data indicate the greater incidence of early neonatal mortality in the twins' group. The NM rate was considerably higher for twins if com-

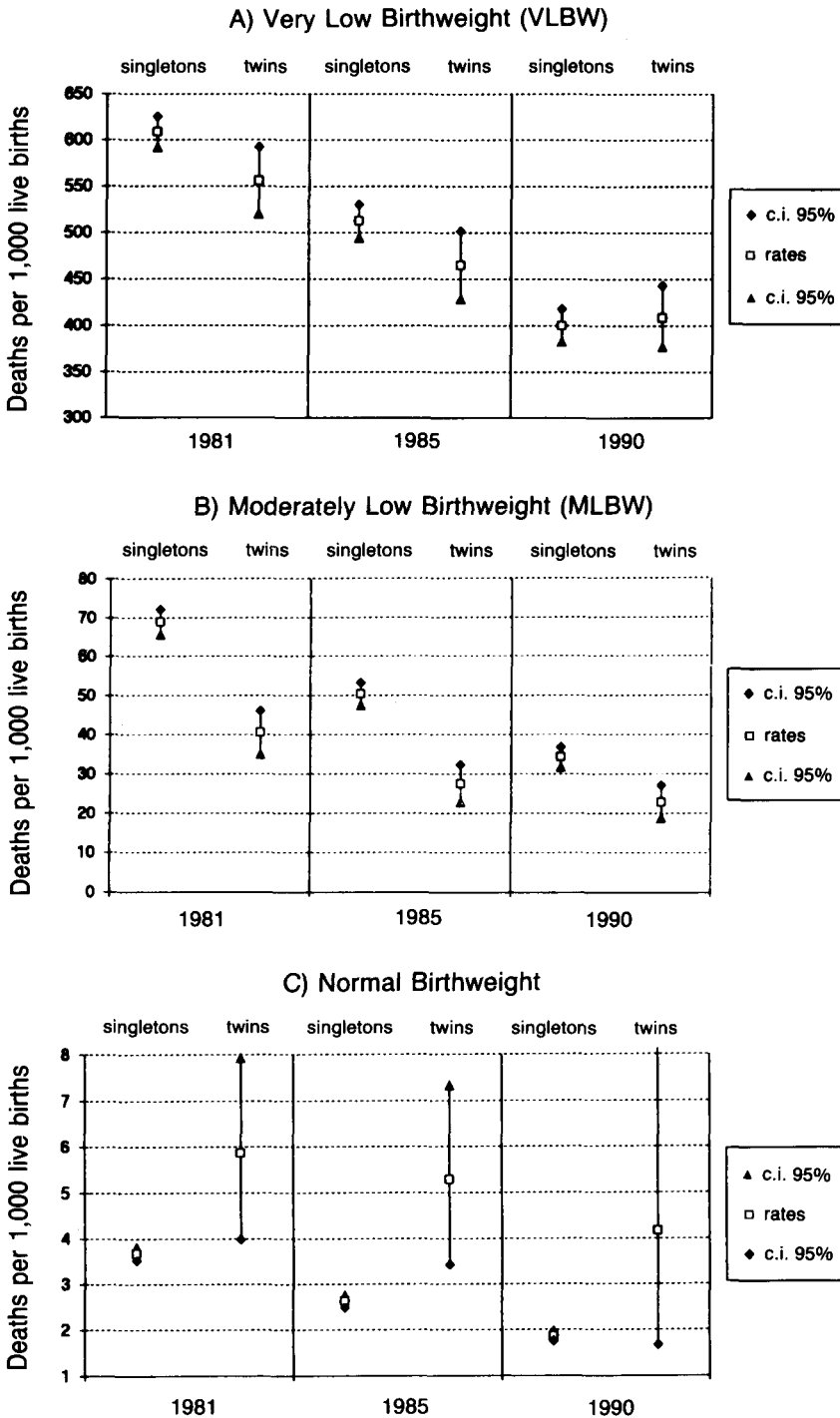


Fig. 1 (A-B-C). Neonatal mortality rates by birthweight among singletons and twins. Italy 1981, 1985 and 1990.

pared with singletons for each major cause of death, with a relative twin/singleton risk of death ranging from 2.45 for congenital anomalies to 14.18 for immaturity (Tab. 2). The distribution of causes of death among twins by geographical area showed an unfavourable and significant difference for respiratory distress syndrome and asphyxia in the Centre South vs. North of Italy (Tab. 3).

Table 2 - Cause-specific neonatal mortality rates for singletons and twins, Italy, 1989 and 1990

	Death rate per 10,000 live births		Relative risk twin/singleton
	Twins	Singletons	
Respiratory distress syndrome	231.6	21.13	10.96
Asphyxia	78.11	9.82	7.95
Immaturity	68.34	4.82	14.18
Congenital anomalies	32.84	13.39	2.45
Specific neonatal causes	23.07	3.71	6.22
Other causes	25.29	4.87	5.19
All causes	459.32	57.76	7.95

Table 3 - Cause-specific neonatal mortality rates (per 10,000 livebirths) for twins by geographic area, Italy, 1989 and 1990

	North	95% C.I.	Centre	95% C.I.	South	95% C.I.
Respiratory distress syndrome	126.4	101-152	278.7	226-333	283.6	253-314
Asphyxia	50.1	34-66	85.5	56-116	91	73-108
Immaturity	39.5	26-54	66.2	16-166	87.4	70-105
Congenital anomalies	28.9	4-128	35.9	10-135	32.7	22-43
Specific neonatal causes	14.5	2-114	35.8	10-135	22.9	14-32
Other causes	23.7	11-123	30.3	5-130	22.1	9-122
All causes	283.2	246-321	532.7	460-607	539.8	498-581

DISCUSSION

The incidence of liveborn twins (particularly from triplet or higher multiple pregnancies) appears to have increased in the last decade in Italy. A correlation with the diffusion of artificial fertilization has been assumed. The higher incidence of multiple births increased the number of VLBW infants who in turn account for a major part of neonatal mortality rates. However, an impressive improvement in the survival of singletons and twins has been observed in the North. A declining NM rate was noted in the Centre-South among singletons only. The difference is likely to depend on the improvement in both obstetrics and neonatal medical care in the North, given that no difference was

found for the mortality incidence in LBW twins in the three areas. The distribution of NM rates by birthweight showed that MLBW twins had a substantial survival advantage over MLBW singletons. These findings, also reported by other researchers [1], are still subject to discussion. It is generally believed that the twin over singleton survival advantage is due to the advanced maturity at similar birth weight. The poorer survival of twins compared with singletons at higher birth weights can be confirmed [4,6]. The reasons for this phenomenon are still uncertain, therefore, further efforts must be made to understand the etiology of perinatal problems in twins of >2500g birthweight.

Many authors reported a higher incidence of hyaline membrane disease (HMD) in twins compared to singletons [3]. Ghai explained that this finding accounted for the higher incidence of VLBW twins. The relative risk of death due to RDS alone (as a whole of respiratory diseases) in twins was found to be ten times greater than that in singletons. The risk of death for immaturity was even higher still. With regard to the greater incidence of congenital anomalies among twins, the risk of death from this cause was double that of singletons. The survival advantage among twins in the North was related to the lower NM rates for RDS and asphyxia than those for twins in the Centre-South. This means that, in the North, modern medical care has been remarkably successful in lowering the NM rates in both singleton and twin newborns. Special needs have emerged in the prevention and care of asphyxia and RDS, and the findings of this study indicate the necessity of better perinatal management in order to improve twin survival, particularly in the Centre-South of Italy.

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